THE LOST ART OF RUNNING

A Journey to Rediscover the Forgotten Essence of Human Movement

SHANE BENZIE
with Tim Major

BLOOMSBURY

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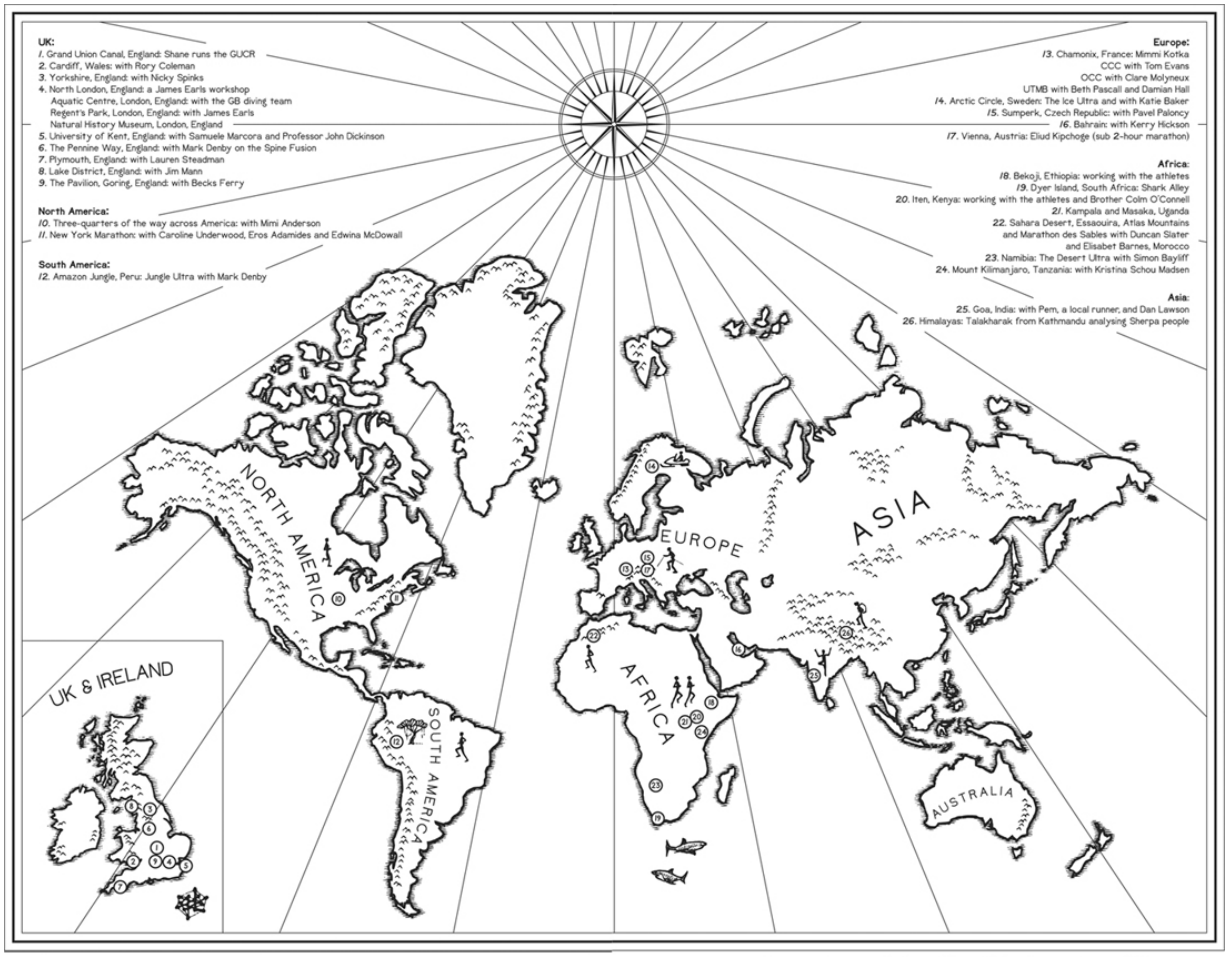

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FOREWORD

The first time I met Shane Benzie was on a weekend training camp for the British 24-hour running squad. In the back room of a youth hostel in Berkshire, he was bouncing around, holding up his elastic wooden toy and generating an excited buzz among the athletes.

If we improved our form even a tiny bit, he told us, keeping our heads up as we ran, and hence our body's fascia system fully stretched, then instead of having to generate all of our movement through our muscles and our effort, we'd be getting lots of free, elastic energy with every step. 'Imagine what a difference that would make over 24 hours of running,' he said. 'That's a lot of steps.' Dan Lawson, the European 24-hour champion, was standing up to one side, hopping from foot to foot, listening intently. Unable to contain his excitement any longer, he yelled out suddenly: 'Come on, let's do it!'

Everything Shane said that afternoon made sense to me, having studied the running form of the great Kenyan athletes when I wrote my book Running with the Kenyans. After his talk, Shane told me excitedly how he had devoured my book, and afterwards had gone straight to Iten in the Rift Valley to study the Kenyan athletes first hand. He'd also been to Ethiopia, Uganda, Nepal, the Amazon jungle. He'd taken the ball I'd bounced around a bit in my book and had run and run with it, studying, observing and listening to the great runners of the world, assimilating everything they had to teach him with openness and intelligence.

Shane is a form coach, but primarily he is a student of movement. He didn't stop at his first discovery, packaging it up as a 'technique' to sell to punters. Instead he has continued to learn, building an incredible bank of

knowledge, working his way step by step towards the essential truth of what good movement is. And now, finally, he has put all this learning down in writing to share it with everyone.

Reading the pages of this book, following the stories of his adventures through the world of running, his lessons and surprises, is as enjoyable as it is informative. Shane is a natural storyteller and his passion and desire to engage are at the forefront of this book. You don't have to be a movement professional to read this book. Like Shane's running sessions, they're for anyone who runs, anyone who wants to find running an easier, more enjoyable experience, anyone who wants to run a little more like a Kenyan – which, I imagine, is almost all of us.

A few months after hearing him speak on the training camp, I got myself assessed by Shane, running around Primrose Hill in London with sensors strapped to my body. His analysis was quick and easy to follow, and his main piece of coaching, that I needed to lift my legs up quicker as I ran, was simple and immediately effective. It was easy to do, but helped me feel instantly lighter and more bouncy. Over a year later, it's something I still remind myself to do on almost every run, especially when I get tired and I feel my cadence slowing. And it always helps.

Even though this book is primarily about running and movement, between Shane and the many runners, coaches and technique experts he meets along his journey, there is also a lot of wisdom in these pages; lessons on courage, application and simplicity that we can relate to on many levels even beyond running.

So I hope you enjoy reading it and hopefully rediscovering some of the lost joy of running, because when you move well, the way your body was designed to, it should feel a little like those Kenyans make it look: effortless. And when running becomes effortless (or a little less effort, at least), it is even more enjoyable and fulfilling.

So happy reading, and happy running.

Adharanand Finn,
author of *Running With The Kenyans*

INTRODUCTION

BEKOJI, ETHIOPIA

We were moving at a pace that I knew my body could not sustain. The only sound I could hear above the light, rhythmic and harmonious footfall of the eight athletes around me was the echo of heavy laboured breathing. It suddenly occurred to me that it wasn't their breathing, though. Theirs was barely audible. It was just my erratic gasping that jarred against the fluid motion of my fellow runners. To be fair, we were running at over 9000 feet above sea level where the air was unjustly thin and each inward breath was met with a disappointingly small return of oxygen. To be less fair, I had been struggling since the moment we started.

Just as I was beginning to listen to the voice inside my head, which for the previous half an hour had been incessantly screaming for me to stop, the 'pack' moved it up a gear and, without a word of warning, almost took flight, gliding into the distance like a bevy of synchronised swans. I skidded to a stop in a cloud of their dust and immediately doubled over to catch my breath. That was apparently just the warm-up.

I was in the tiny Ethiopian town of Bekoji – a place with a population of fewer than 17,000 people which, despite its diminutive size, boasts runners who have between them won 8 Olympic gold medals, 10 world records and 32 World Championship titles. It was now so renowned for its success that it had been affectionately nicknamed 'the town of runners'. I was training with some of Ethiopia's best young prospects and, as it turned out, the learning curve was as steep as the hills they ran on.

This was not only an incredible experience but it also marked a pivotal moment in my life. It was a moment of clarity in an otherwise oxygen-deficient haze that planted a seed that has grown into the research I now passionately cultivate. The common approach to running is to put on a pair of trainers and 'try hard': maximum effort equals maximum results and the winners are those who give it the most blood and thunder. Even on the

morning in question, I'd given my all. What was very different, though, was that my companions weren't showing any signs of this 'no guts, no glory' approach. They didn't accelerate due to increased determination. If that had been the case, they'd have been grimacing and cursing like I was. Instead, they were all smiling as they moved gracefully away. The increase in speed was not visibly an increase in exertion. It was an effortless, beautiful motion. I couldn't put my finger on how they did this but, from that moment on, I was absolutely certain of one thing: I was going to find out.

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My route to Ethiopia was not an obvious one. Six years before that track session, I wasn't even a runner. I was, however, already fascinated by the movement of a species. It wasn't humans, though. It wasn't even on dry land. My journey, just like the earliest forms of life on earth, began in the water.

DYER ISLAND, SOUTH AFRICA

Located approximately 5 miles off the coast of Gansbaai in South Africa lies Dyer Island. Originally known as ‘Ilha da Fera’, which roughly translates to the ‘Island of Wild Creatures’, the island is the long-suffering neighbour of a colony of around 60,000 Cape fur seals, who occupy nearby Geyser Rock. You can be several miles away and know all about those seals. Their pungent aroma, which wafts freely across the coastline, is not lost on the other forms of wildlife that maraude the sea either.

The waterway that runs between Geyser Rock and Dyer Island is the reason I’d travelled several thousand miles to be here. I wasn’t interested in standing with the tourists on the ominously named Danger Point peninsula, and I wasn’t here to observe the seals as they made their way out playfully into the water to hunt for food. What I’d come to see was the great predators of the sea that picked up on the presence of those seals and swam slowly but with deadly purpose to investigate. I was here to get into that thin waterway that funnels narrowly between Dyer Island and Geyser Rock. A stretch of water that must be considered to be one of the most dangerous on the planet. I was here for ‘Shark Alley’.

There are few things more powerful on earth than witnessing a great white shark breaching – its form rising out of the water, eyes rolled back and mouth wide open, its razor-sharp teeth lined up on parade as its jaws close abruptly on its unwitting prey before the whole mass of shining skin and sinking teeth disappears below the surface. A momentary disturbance before all is still again. The amount of raw power and force involved in that attack is frightening, as the shark engages in the final throes of the kill.

Getting into the water with something that you know is capable of instigating such a swift and violent episode is not easy. You realise how small you are compared to these giants of the sea. How ill-equipped you are

to defend yourself should one of them decide to crush the defenceless human body that's dared to put itself within reach. That moment when sitting on the side of the boat, fixing goggles and checking gear, was always a very lonely one. I would often contemplate my life choices and question my motivations. Why was I here? Why was I doing this? Why was I not just sitting in the comfort and calm of my home with a good book and a coffee? Then there was the decision to leave the boat and drop below the surface. Into the unknown. Taking that final leap of faith before a calm concentration took over. All questions emptying from my mind. Suddenly focused on what I was there to do.

Being up close and personal with these intriguing creatures was essential to my research and something that I had come to savour. There was still so much that we didn't know about them. So much to learn from joining them in their natural environment. Every time I went into the water, I felt a deeper connection with this species.

For this trip, I was in South Africa to work with Chris Fallows, an expert in his field and, in particular, in analysing the breaching behaviour of sharks off this particular coastline. As a director of the Shark Conservation Society, my main objective was to analyse shark populations in our oceans and to lobby for increased protection. The traditional way to understand and monitor shark populations was to attend fish markets and to spot sharks from boats. I felt the need to go deeper and so had spent several years travelling to known hotspots around the world, including in the Middle East, Mozambique and South Africa. As a result, I'd been in the water with great whites and tiger sharks, sometimes in a cage and sometimes not, as well as swimming with bull, blue, porbeagle and whale sharks and giant mantas. I had developed a greater understanding of the behaviour, habits and emotions of these colossal creatures.

None of the work I did with sharks related to running, of course. However, while I didn't appreciate it at the time, it was an ideal grounding to my future work with humans. It laid a template for how to observe a species: analysing and recording movement and behaviour in the natural environment. And if you want to analyse a species that has been able to successfully withstand the test of time, look no further than the shark. Survivors of all mass-extinction events, sharks are the result of 450 million years of evolution, although they have hardly had to evolve in the last 100

million years, probably because (apart from the relatively modern threat posed by humans and the odd killer whale) they have no natural predators. In a test of the survival of the fittest, the shark is the undisputed king of the sea.

Sharks move as nature has always intended them to. They travel constantly in search of food and start each day knowing that they need to eat. For most sharks, 80 per cent of the time, an attack will end in failure. As a result, they don't go out on training swims or refine their hunting skills with drills or specific exercises. They can't afford to waste the energy.

This is where humans as a species are now very different. Most of us no longer wake each morning under that constant pressure to find food. We can just walk to the kitchen or get in a car and drive to a shop or cafe in order to eat. If we want to use our bodies for a particular pursuit, we tend to need to train for it. If our daily activity were hunting for food, which is where our species started, we would not waste the energy on training. We would conserve our energy for when we needed it. Our bodies would be conditioned and ready for the task because we would spend most of our time doing it.

My work with sharks also gave me an incredible sense of adventure and the desire to travel to the far corners of the earth if necessary in order to observe and learn. I was pushing my nerves to the limit when dropping into the ocean, knowing I would be surrounded by any number of primal, untamed sharks. It made me want to push myself in other aspects of my life, too, exploring not only on a geographical level but also a physical one, seeing how far my body and mind could remain strong when taken to their limits. That's when I found ultra running.

GRAND UNION CANAL RACE, ENGLAND

The Grand Union Canal. An icon of Britain's pre-war industrial past. An ambitious amalgamation of waterways running 145 miles and linking the powerhouses of Birmingham, Manchester and London. For most people, travelling the equivalent distance to the length of this colossal stretch of water would be considered a long drive. For me, it was all that stood between the start line where I nervously waited and the finish of one of Britain's longest and toughest single-stage footraces.

The Grand Union Canal Race (or GUCR, for short) is a grassroots British classic. People were doing this race long before running ultramarathons was considered cool. There's none of the commercialisation that we are used to seeing at most other big endurance events. Entries are limited to 100 runners. There's a 45-hour cut-off. There's no medical back-up or support. Along the way, you can stop in a pub or gorge yourself on sweets being handed out from a 'candy barge', but if you rest for longer than 40 minutes in one go, you're disqualified.

The start line was a buzzing melee of uncertainty. A collaboratively concocted scent of Deep Heat and fear filled the air. The nerves I felt were similar to those I'd experienced just before entering shark-infested waters. I was checking my gear repeatedly, my steely faced exterior surrounding a bag full of nerves. I didn't know if I could do it, or if I would be quite the same man when I resurfaced. I just knew that I was ready to find out.

And then we were off. Diving into the world of human endurance events. Moving freely among the 99 other slightly unhinged individuals from all walks of life, it felt like the beginning of something very special. In a way, it was. It would just take me a long time to realise it. The day itself would not pan out as I had planned.

I made all the classic mistakes. Fired up and ready to take on the challenge, I went off way too quickly. Of course, I felt fine and in control at the time, but try telling that to my legs 70 miles later when each step sent colossal pain shooting through my left knee and confined me to nothing more than a slow shuffle.

At that moment, now understanding exactly what athletes meant when they talked of the ‘pain cave’, I was in a truly dark place. I could see no inkling of light. I made the difficult decision to stop.

My short running career, which had started when I was already ‘a veteran’, commenced with a few 10km races and quickly progressed to marathons and then a 50-mile ultramarathon. I could see no ceiling. I wasn’t a fast runner but I had the ability to endure. I wanted to test myself to the extreme and started to look for the longest races I could possibly find. That’s when I signed up for the GUCR.

I trained hard, focusing solely on long, slow running to make sure that I could cover the distance. I suffered hard, running through endless niggles and continuing to work long hours despite the profound tiredness caused by constant mileage. I was always pushing through the fatigue, always on the edge of injury or illness. It was my battle. I had resolved to succeed no matter what. All I had to do was keep going. Until that moment, 70 miles into the race, when I no longer could, and my short flirtation with the sport felt like it was over.

A few days later, I was still hobbling around in all the various shades of pain and turning the air a single shade of blue. Yet, in what I later found out to be classic ultra runner fashion, I was more determined than ever that I would finish that race. It became my obsession. I had failed my first attempt miserably, with a big ‘DNF’ (‘did not finish’) next to my name, but I resolved that I would spend the next year training harder, putting in more miles and exploring anything that promised to make me a better runner.

I obsessed over gear, convinced that a new pair of trainers might make a difference or that a lighter running pack could give me the edge. My thirst for marginal gains left me susceptible to every marketing trick in the book, even spending £25 on a pair of socks with a silver lining designed to add spring to my step. I rejigged my training plan, still putting in the long, slow miles but going further in the hope of building a bigger and better engine. I focused only on that finishing line. I became a ‘proper’ runner. Whenever I

encountered another similarly obsessed individual we'd begin talking in our own common language. I could spend hours discussing carb loading, glycogen levels, keto or plant-based diets, aid stations, gels, bars, salt tabs, electrolytes, bladders and soft flasks. (To runners, these topics are broadly placed in the categories of 'nutrition' and 'hydration'. To everyone else, it's 'eating' and 'drinking'!) I could chat confidently about pacing, peaking, tapering, fartleks, intervals, hill repeats, cross training, foam rolling, technical trails, gnarly descents, 'vert' and junk miles. Everything had a name and every bit of gear had a purpose. One day I even found myself genuinely trying to explain to my wife, Trudi, that the jacket I had bought the week before was waterproof but the one that I now needed was windproof and breathable and so served an entirely different purpose.

I was in deep. Yet, despite my preparations and obsessions, by the end of that next year my knees had reacquainted themselves with acute pain and I had another Grand Union DNF to my name. I was under a dark cloud and even though my rather ineffective socks had a silver lining, this particular cloud did not.

What I could see in myself and in so many of the people running beside me was a consistent cycle of hard graft, frustration and injury. I was beating up my body on a gigantic scale. There was no escaping it: my focus on long, slow running had turned me into a shuffler. I lived with niggle after niggle, ignoring the problems, determined to push on through. It was a classic 'no pain, no gain' attitude. I was convinced that ultimately the niggles would clear up and that my training would all come together. Hoping that some foam rolling and the occasional sports massage would fix me up. That a liberal application of kinesiology tape might hold my aching limbs together for another run. Truthfully, though, I was turning up at the start line already half broken.

So far I'd been trying to buy my way out of trouble. It dawned on me that perhaps the paraphernalia surrounding the sport was clouding my judgement. What I needed was not more gear. Not a different pair of trainers. Not more miles. Not more training. What I needed was more knowledge. In truth, I knew almost everything there was to know about running but next to nothing about how to actually run.

At this point in my life I owned a successful business sourcing car parts for garages but my running obsession was taking up more and more of my

focus. I wanted to learn more about what made a good runner and find a way to fix those damaged knees. I wanted to coach myself and others to be better athletes. I sold the business, swapping auto mechanics for biomechanics, and headed to America to train as a running coach.

The early days were inspiring. I became well versed in biomechanics – right back to the foundations laid by the likes of Aristotle, Galen, da Vinci and Galileo all the way up to the modern day. These ideas, broadly taken from engineering principles and still embraced when we studied our movement and analysed the structure of the human musculoskeletal systems, were fascinating and I lapped them up.

While this had a limited impact on my own running, I started to see some results in the runners I was coaching. Most people came to me to improve their running gait. I was not a successful runner with a proven track record to draw in clients but I could stand by a treadmill, analyse how they were running and talk intelligently about how their technique fitted with what I thought a runner should look like. Whenever I encountered a heel striker who was landing heavily on a straight leg, I taught them to increase their cadence (a measure of how many steps they were taking per minute) and land with their foot beneath them rather than striding out in front of them and landing on a straight leg. I evangelised on the dangers of too much impact, telling runners that they were hitting the ground too hard. I told them to lighten their steps by imagining that they were running on thin ice or hot coals. The change in those runners was visible as they landed far more naturally and more gracefully. And, crucially, as most of them had come to me because they kept getting injured, the changes we were making were helping them to recover and remain injury free.

These glimpses of success gave me confidence that I was on the right track. However, as quickly as I had become a frustrated runner, I soon became a deeply frustrated coach.

The runners who were able to put all of this into practice on a treadmill – which is how I was coaching them at the time – found it very difficult to put it into practice when they got outside. They started shuffling – almost sucked to the ground by their newfound technique, pitter-pattering along with light steps and, in some cases, working much harder than they were before. My teaching of biomechanics was getting them moving in a textbook fashion but they didn’t look dynamic. They looked tense and

robotic. Almost *too* mechanical. Worst of all, when those who were now landing well came to me and asked how they could now run faster, I genuinely didn't have the answer.

What I did know was that the runners I encountered did not move like I thought a human should move. They didn't show the beauty or grace of the runners that I'd seen on the TV competing in the Olympics and no matter how hard we tried, they struggled to even get close.

I began to realise that, wherever I turned for information, everything I read seemed to be based on studies carried out on a treadmill in a lab. It made sense. Most studies on running gait needed to go through ethics testing in order to be published. In order to get through ethics you needed a clean data set. In order to get a clean data set you needed to be able to control the environment in which your study was conducted. The best way to do that was to ensure that the results couldn't be skewed by external factors, such as wind or rain. A treadmill in a lab ticked all of the boxes. Every coach – including myself – seemed to therefore gravitate to teaching running form using the same machine.

I chewed on that endlessly but I just couldn't swallow it. When it came to our running form, we were being served – and as a result were ourselves serving – a diet that was not even based on how our species was designed to move. It was instead based on how our species moved when placed in a room on a machine. A machine that requires most of us to put more effort into staying on than actually replicating the movements required to efficiently propel ourselves forwards. Those were the studies we were relying on to inform us, the ones we were teaching the teachers with. The ones that the papers and the textbooks and the courses and the coursework were largely based upon. The ones that told us how to run. Was it any wonder, then, that the results were encouraging us to be mechanical in our movement? I couldn't get my head around why we would use this as a marker for how we should naturally move. What about when we got off the treadmill and started to run outside? What about when we needed to twist to get around an obstacle, step over a tree root or deal with rocky, muddy or undulating terrain? Surely all of those factors affected our movement?

I resolved that there must be another means to study the best way for us to run. And that brought me back to my days in the water. I'd already learned that studying a species in its natural environment gave you the maximum

chance of understanding it. When I was analysing sharks it would never have been acceptable for me to watch them in a tank where they were fed by humans every day and to use that as an indication of how a shark naturally behaved. Yet, from my research, there weren't really any studies available that actually explored how people were running outside in the natural environment.

I realised that I shouldn't just be looking at individuals as athletes. I should be looking at them as one of a species. And I needed to find out how our species was first intended to move in order to understand how to coach movement as a skill. I wasn't trying to write a paper. I didn't need a controlled environment to ensure a clean data set. The answers to many of my questions did not seem to lie in dusty corners of libraries or in papers published on the internet. For me, *that* data was skewed.

The ideas behind biomechanics arguably dated back to Ancient Greece but it was still a modern study compared to the secrets of how our species evolved to run. Those were the secrets that I was now determined to unearth. I had to shift my mindset from that of a student to that of an explorer. After all, Indiana Jones didn't find the Temple of Doom by sitting on his backside in an office reading books. He had to work far harder to unearth secrets that had been hidden by time. Equally, I was going to need to go far further and into far more remote and potentially dangerous locations if I was going to truly observe our species moving in different natural environments and to witness those less touched by the deeply set ideas and teachings that I'd encountered.

It was at this point that I also decided I would film people running, take running dynamics data from sensors that I had started to develop with the University of Kent, and build a picture – a visual and statistical database – of the attributes I observed so that I could begin to determine what made these runners move as they did. What made someone fast, what made someone efficient, what made them strong, what gave them endurance, how they adapted to different terrains and more extreme environments. I wasn't interested in their engine (their cardiovascular system). I'd already worked out through my own running how to develop one of those. No, this was all about moving as our species is intended to move. And armed with my findings, I would be able to coach runners using the very best, most natural running techniques that I observed all over the world.

I promised myself that I would no longer coach using second-hand teachings. I'd use only my first-hand findings. My coaching would no longer be running regurgitated. It would be running reborn.

At the airport returning from another trip to America, I noticed some African runners fresh from competing in the New York Marathon. It wasn't just their bright tracksuits that caught my eye. It was the way they glided through the terminal. They exuded confidence and presence. They were shorter than many of the people around them but they seemed to stand much taller. They didn't slouch or lean on one hip as they waited for their flight to be called. As people bustled around them, heads down and phones out, they all blurred into insignificance as these athletes shone out from the crowd.

For days, I couldn't shake that image. I knew that Africa had a great history of producing world-class distance runners and I was drawn to the idea of finding out more. That's when I decided to travel to Ethiopia. There seemed no better location in which to begin my journey than a place recently dubbed the 'town of runners'.

PART I

THE JOURNEY

BEKOJI, ETHIOPIA

‘*Ferenji*! *Ferenji!*’ they screamed as they scattered out in front of me, darting down the various dirt tracks that separated the ramshackle huts that lined the road I walked along. The Chinese had laid the road only 18 months earlier and the local children were behaving as if I was the first pale ginger runner that had ever walked along it.

Ferenji is not a good word around here. To these kids, it was like the bogeyman had finally turned up on their doorstep. Whatever naughty deeds they had once committed no doubt weighed heavily on their consciences as they spotted me strutting like a peacock down the street with Coach Sentayehu.

I didn’t want to scare anyone, of course, but I was quite enjoying the attention. All of the adults were staring at me like I was a highly decorated athlete from abroad. I must be something special, they no doubt thought, to be walking down the street with the well-respected and now relatively famous local man they knew simply as ‘Coach’. A man whose star had risen exponentially thanks to the disproportionately incredible success being enjoyed on the world stage by athletes under his guidance.

I puffed out my chest in order to play the part but soon wilted when I realised that they were all expecting me to now demonstrate my running prowess on the beaten-down ochre-coloured earth that passed for the local running track.

You don’t have to look too far back in this book to find out whether or not I lived up to the hype. This was the run with the pack that left me gasping for air in a cloud of dust as I watched those graceful athletes pull away.

I sat down on the trackside feeling more than a little sick. The vultures that had moments before been perched on the pylons surrounding the track now started circling, no doubt sensing a man on his way out. The kids

regrouped and just stared, looking a lot less scared now than before. Their faces said it all. The '*Ferenji*' might look intimidating but, don't worry, he won't be able to catch us!

After leaving America and deciding very early in my coaching career that in order to unearth the secrets of how our species is designed to run I would need to analyse and film athletes from all corners of the world, I'd made my way to Bekoji through two organisations: Running Across Borders and Girls Gotta Run. I met them in the country's capital, Addis Ababa, and we travelled together by road. As well as working with them while I was over – Running Across Borders, who specialised in coaching and mentoring young athletes, had collaborated with Girls Gotta Run to encourage young women to become competitive runners and I'd agreed to help – they were also my ticket to get in front of Coach Sentayehu.

Sentayehu Eshetu, to give him his full name, was a humble man despite the recent media attention, which had been further stoked by a documentary about Bekoji entitled *The Town of Runners*, released in 2012. He was also clearly used to being the final word when it came to running. Around here, when he spoke, everyone listened. That wasn't because they were scared of him or because he raised his voice. He didn't need to. He had their overwhelming respect. Arriving to teach at the elementary school, Coach had begun to see the athletic potential of local children and started coaching them. His first success – which was to coach Derartu Tulu, who became the first African woman to win an Olympic gold, in Barcelona in 1992 – was soon followed by success for athletes such as Kenenisa Bekele; siblings Tirunesh, Genzebe and Ejigayehu Dibaba; Mestawot Tadesse; Tariku Bekele; Mestawet Tufa and Dereje Regassa. He was always full of smiles and playful. He understood his athletes and had empathy for where they came from and what they aspired to achieve.

I wanted to learn from him and to see how this small part of Ethiopia could produce such a host of athletes who were tearing it up on the world stage. He spoke in clear, albeit accented, English but, having turned up without an appointment, I still don't think he really understood why I was there.

We exchanged pleasantries. I asked if I could tag along and perhaps hold his jacket. He simply smiled and nodded. I expect he thought I was there for

a few hours. I very much doubt he realised at the time that he was adopting this poor excuse for a coat hanger for a whole month.

I was fresh out of my training in America and early beginnings as a coach but this couldn't have been further from the foundations of my education. This wasn't a lab or a clinical environment with treadmills and clipboards. It was a real environment where I could watch and learn. Where I could begin to film and analyse athletes. I was nervous and excited to be here. I felt like I was exactly where I was meant to be.

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My alarm went off at 5 a.m. the following morning. Dressing quickly and pulling on my running shoes, I made my way out to a quiet corner of the town where folk had started to congregate. There was a cold bite to the air. I zipped up my jacket, pulling the collar tight around my neck.

As the sun rose, they lined up on the edge of the forest, their profiles silhouetted against the treeline. There must have been 80 runners gathered in a colourful array of ragtag sports clothing, perfectly synchronised in their graceful, dynamic movements, their constant footfalls creating a rhythmic marching beat. Steam rose up from the group as their warm bodies met the cold morning air, adding to the already mist-infused atmosphere.

It was a mesmerising scene. Their movements deliberate and controlled, yet graceful rather than mechanical. They marched, they crouched, they walked on their haunches and they swayed their arms. At all times the rhythm, the chanting and the beautiful movement created a sensory overload for my unaccustomed mind, so used was I to seeing static stretching as the cornerstone of a pre-run routine. Every so often, Coach would walk among them and call out instructions, correcting their posture or reminding them to relax. They always adjusted accordingly but never broke their stride.

After all of that rhythm came a mighty chaotic dash, as they splintered off into the forest, zigzagging around each other and negotiating the uneven terrain with ease, pushing fast and slow, up and over the constant gnarly undulations and moving gracefully between the trees.

I watched in fascination. Eventually, I started to see the measured intricacies in their movements and how this would alter as the speed or

incline changed. At first, I related this to them being on a mountain bike, whereby they would change gear to negotiate a change of speed or direction. But it wasn't visibly mechanical. It wasn't a change in effort. What really held my attention was that they did this not by trying harder, but by accentuating or softening their movement.

I picked a quieter moment and approached Coach Sentayehu. I felt like a young Jedi in front of Master Yoda. I wanted to know the thought process behind this warm-up. It was like nothing I'd witnessed before and a sea change from the usual pre-run stretching schooled by so many at home.

'Can you tell me why they do this?' I asked tentatively.

He grinned from underneath his peaked cap. Then his face changed to an expression that suggested he was perhaps a little baffled by my question.

'To get the body moving,' he exclaimed. 'We must get the whole body moving and get rhythm into our movement.'

To him it was obvious. To me, it was a crucial crumb to follow. I was watching them putting in the miles running on the rolling hills, pushing themselves with hard sessions on the dirt tracks around the village and darting around trees in the forests, splintering off from the usual running pack and choosing individual lines to take through the undergrowth. I had expected just to see them on a track every day putting their legs through the hard miles but what I realised there and then was that, to them, running was not a 'no pain, no gain' try hard skill. It was a whole-body movement skill. They were losing themselves by focusing on the technical terrain every morning in that forest in order to create balance and awareness in their movements. They were conditioning their bodies in a different way. The track was where they performed, the forest and hills where they prepared for the performance.

It's the classic iceberg analogy. You may see the tip when these athletes are smashing it on a world marathon stage but it's what you don't see – the hours preparing their bodies for the rigours of running 26.2 miles in just over two hours – that sits below the surface out of view. That's the foundation that the visible success is built upon. That's what makes it seem effortless when, in terms of their training, it was anything but.

During the month, I got to know this small part of the world very well. Without wishing to sound condescending (as it was something I viewed as a positive), it felt like a place that was largely lost in time. Very few

Westerners visited, there was no internet, families gathered to crowd around a single television in the village to watch local athletes competing on the big stage in the Olympics or at a major city marathon. They loved to run and they did it together – harnessing the sense of community and the power of the group.

Up until now, all of my learning was about achieving the best gait by understanding the mechanical workings of our body. This wasn't what I was seeing here. Their movement wasn't in any of the much-studied textbooks. This was something different. The athletes ran tall with their chests out in a controlled, fluid motion. When they ran, their legs seemed incredibly long – like matchsticks connected by stretchy elastic bands – even though they were perfectly in proportion to their bodies when they stood still. Something mechanical is constrained. Shackled by the levers and joints to which it attaches. This wasn't something that I could relate back to the biomechanics that I had studied. It was fast and flowing. It was freedom personified.

I kept coming back to the word 'elastic'. I wanted to try to understand what I was seeing here in Bekoji. I wanted a viewpoint that didn't come from the traditional biomechanics that I was used to and was beginning to question. After much research, I hit upon a seminar in London with a guy named James Earls. It wasn't about running but it was about dynamics. It looked like it might be relevant. I booked a place as soon as I touched back down in Britain.

AN INTRODUCTION TO FASCIA

Myofascial Anatomy & Dynamics Workshop, North London, England

He stood at the front of the room and grabbed a long piece of green stretchy elastic. His mouth was moving and words were coming out but I couldn't really hear them. My mind was on other things. I'd parked in a supermarket car park with a two-hour maximum stay and all I could hear was the *Countdown* clock ticking in my head, nearing that final crescendo when my time would be up and that parking ticket would be mine.

Just as I was beginning to plot a ninja-like exit, he stood on one end of the elastic and pulled the other end all the way to the base of his chin, standing supremely tall and creating a bow from his chest to accentuate a beautiful and graceful posture that made him seem incredibly elegant and athletic.

The moment hit me like a fast-moving train. I'd seen this before. Not the demonstration but definitely the stance. His posture was exactly what I'd seen through that cloud of red dust as the runners on the dirt track in Bekoji left me for dead.

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The seminar had started with 19 raised eyebrows. All of them attached to 19 strange looks. All of them pointing in my direction.

All I'd said, in response to James going around the room and asking us to introduce ourselves, was: 'My name's Shane and I'm a running coach.'

As it turned out, that made me a highly unusual participant. All of the other attendees were yoga or Pilates instructors and, as it so happens, all were female. Even James glanced up to take a second look at the strange anomaly who had rocked up to his talk sporting a pair of cargo shorts, a keen face and a sackful of questions.

After the elastic demonstration I was no longer bothered about the parking ticket or the unexpected attention. I'd swallow the fine. I was happy to be the odd one out. Quite frankly, I didn't give it a second thought. I was fully immersed.

My mind raced, trying to process what I'd just seen, but it just didn't compute. How come the runners in Ethiopia knew about this beautiful posture but the runners I saw hunched over themselves running around the park or heel striking along the pavement in the UK didn't? How come a lecturer hailing from Northern Ireland was demonstrating this to a room full of Pilates instructors (and me!) and yet I'd only ever seen it before on the dusty tracks of East Africa?

What followed marked a seminal moment on my journey. A moment when my tunnel vision started to broaden. It was the moment that James started to talk about fascia.

'I want you to forget everything you've ever been told about anatomy,' he began.

'Most of us are living under the illusion that, for a long time now, humans have had it all figured out. That we have labelled every part of the body. That we know how each one of those parts functions. How each one interconnects. That we have exhausted all avenues. That we have all of the answers.

'But then, remember – at one point in history, we believed that our system was made up of four humours. And that the earth was flat. Until we didn't.

'Many people have become increasingly frustrated by the anatomy of individual parts. We have this very sophisticated system of labelling everything, yet when we see an animal or a human moving, we see a complete integrated body.

'The inconvenient truth,' he added dramatically, 'is that our conclusions in anatomy just don't stack up.'

I nodded eagerly, excited to hear where this was going.

'Well, that's because there's something that we missed. A crucial ingredient that we discarded. An entire system that holds the key not only to our movement but to our evolution as a species. It's something that is multifactored, multidimensional and truly exciting and yet it has been largely ignored for the past 2000 years.

'It's called fascia.'

James scrawled the word slowly on a whiteboard as he spoke, as if to underline its importance. The pen squeaked to an abrupt and dramatic stop as he finished writing, the sound echoing around the now deadly silent room.

‘Fascia is the fabric that holds us together,’ he continued.

I was starting to feel very fortunate that I’d stumbled across James Earls. Considering that what he was describing was so ancient, it sounded, paradoxically, like it might be at the cutting edge of our understanding of the human body. It was also already resonating far more strongly with what I witnessed in Bekoji than anything I’d heard or read before. I had to admit, though, as excited as I was, I still didn’t really know what he was talking about. Thankfully, the explanation was coming.

While apologising in advance to any vegetarians or vegans among us, James asked us to imagine that we were portioning a large slab of raw meat. The fascia, he explained, was the thin, fibrous, stretchy tissue that surrounded each piece. It was dull and grey and as a result, over the course of our history of examining the human body, we had traditionally presumed that it was also passive and uninteresting. So, we had cut it away and discarded it without even a second thought, instead focusing on the more interesting-looking muscles and organs beneath.

‘Appearances can be deceptive, though,’ he added. ‘Fascia is – quite literally – one of the most dynamic things in the human body.’

And there was quite a lot of it to cut through. James explained that each muscle was contained in a type of bagging made up of this film. In fact, nearly every structure in the body was. These fascial bags gave organs and muscles their shape, maintained their boundaries and ultimately held them together. Each individual muscle fibre and each bundle of fibres was held in place by a series of fascial bags and all of those bags came together at the muscle ends to form thick, strong tendons. This stretchy, film-like, body-wide, three-dimensional web of tissue supported the muscular and skeletal system. It didn’t have the so-called attachments and points of insertion and origin that we talked about in anatomy – it just kept on going from one bit to another – a continuing element throughout the whole body.

I was just about keeping up as James accelerated into an explanation of why fascia was so vital to our movement as a species.

‘Fascia is made up of a number of constituents but the most common one is collagen and it comes with elastic properties,’ he explained. ‘This means that, when the mechanics are right, the momentum created during movement can be used to stretch the fascial tissues.

‘When you stretch them,’ he said as he pulled the piece of green elastic tight between his hands, ‘these tissues capture and can momentarily store the resultant energy…’

He let one end of the elastic go from his left hand and it snapped back into his right. ‘…before returning it into our system to help us move.’

James once again stood on one end of the elastic, pulled the other end tight up to his chin and adopted that tall, elegant, chest-out pose. That stance again. The one I’d seen in the runners in Bekoji. (See here.)

‘To put it more simply,’ he added, ‘in this demonstration, our fascia is just like the elastic.’

I was amazed that this was the first I was hearing about fascia. Look it up in a book about the body and it gets little more than a few passing references. There are even fewer in a book about running. Yet it seemed to have a crucial role to play in our movement.

James was not the only great mind working in this area. He talked of Professor Robert Schleip, a German biologist who worked at the cutting edge of research into fascia. He had also worked with an American named Thomas Myers. During the 1990s, Myers had developed a model that mapped out the connections running through the fascial fabric. This model, which Myers called ‘Anatomy Trains’ (also the title of his successful book and of the organisation through which he now teaches), showed the myofascia – which is the muscle and fascia in combination – running in continuous lines through the body. These unbroken lines, which Myers referred to as ‘myofascial continuities’ or ‘lines of fascia’, worked much in the way that James’s demonstration with the piece of elastic suggested: by connecting all the way up the body to create a system that can be pulled tight when we adopt the correct posture and ultimately used to propel us forwards.

In his own book, *Born To Walk*, James then developed this theory in the context of why and how humans walk and, in particular, why we as a species went from being quadrupedal to bipedal. In other words, why we got up from all fours and started to walk on two legs. His conclusions

offered a fascinating insight into the importance of the fascial system to our survival as a species.

‘We are often compared to chimpanzees but, at least physiologically, we are not like them at all,’ he explained.

‘Pound for pound a chimpanzee’s muscles are far stronger than ours, giving them an explosive power that we simply don’t have. What we chose – not consciously but through the process of evolution – was an elastic rather than a muscle-based strategy.’

In other words, we got up and started walking in order to harness the elasticity in those long trains of fascia in our body and increase our efficiency of movement.

James went on to explain that, thanks to this system, once we started to walk on two legs, we covered much longer distances by utilising the stored energy in our elastic tissue. That allowed us to expand our territory, go further with less effort, explore more and find calories through persistence hunting. It opened up a different way of life. One that ultimately ensured our survival as a species.

I couldn’t help but make the inevitable next leap in this thought process. If fascia was the reason that we started walking, it surely also had a direct influence on why – and, most importantly, how – we started to run.

How we understand our movement when we run is based on how we understand anatomy. At least in the Western world, we have grown up learning that we are a mechanical thing and we are therefore moving in a mechanical way. But it was a long time after human beings had begun running around hunting animals with pointy sticks in our hands that biomechanics even became a thing. It is the way that we’ve come to understand movement but one that, from what I was hearing, was fatally flawed.

Leonardo da Vinci drew the *Vitruvian Man* in a very block-like way and we have taken cues for architecture from that. Now, we seem to have gone full circle and taken our perception of our movement – and our understanding of anatomy – from architecture. That’s led to a perception that the skeleton is a relatively heavy stabilising structure that combines with the individual muscles attached to it in order to work like levers. That’s what gets us standing and moving. As a result, when we explain good running form, we approach it like we are stacking boxes. Our knees

above our ankles. Our hips above our knees. Our head on top of our shoulders.

But we have been focusing on the wrong structures. For all of the systems you can find that will use levers and block-like buildings, we can find different, far more graceful examples of how things are held together.

A suspension bridge, for example, is formed of many heavy and cumbersome pieces. It can sway in high winds and it can carry extremely heavy loads – not just because of the steel and concrete that make up its parts but, crucially, because of the way those objects are suspended. The way that they float. The key is tension.

In the same way, there is an alternative way of viewing our skeleton. A way that fits far more closely with what I see when I watch someone run. It is not a stabilising structure from which everything else hangs, as our traditional teaching of anatomy suggests. Instead, it's a collection of individual bones that are floating. The body's soft tissues, especially the fascia, support the bones by keeping them in place and also moves them by changing the tension that they are under via muscular contraction.

This comes down to something that James explained is referred to as 'tensegrity' (a concept formed from the words 'tensional' and 'integrity'). This is where individual components – in our case, our bones – float in a sea of tension.

This concept was first developed by artist Kenneth Snelson and then furthered by architect and designer Buckminster Fuller. Snelson created sculptures using steel bars connected by wire. The bars did not touch one another but were held in place by the tension of the wires. In the same way, their work suggested that our bones float in the soft tissue – in a sea of tension – and that the soft tissue adjusts the stiffness of the system in response to the forces acting on the body.

'And it makes sense,' added James. 'Think about the model of a skeleton that your teacher used in your science lessons at school. It stood at the front of the room perfectly demonstrating which bones fit into which sockets. Yet, what was holding it together? Wires and screws. Without those fixings, it would simply have been a pile of bones on the floor. It's the same with our body but the wires and screws are the myofascial system. That's what holds everything together.'

I wanted to understand what this would mean for us when we run. I posed the question to James.

‘Each bone has its own little trampoline that it sits in and it will bounce within that trampoline following every foot strike,’ James explained. ‘As ground reaction forces push up, gravity pushes it down and momentum encourages it mostly forwards. Like a trampoline, each deceleration experienced by the bone will stretch the surrounding springs or, in our case, the elastic tissues, and this helps us increase efficiency of movement. It is all a suspension system helping to dissipate landing forces through the body so the shock of impact is not taken only by the foot or isolated to the lower limbs. The forces are also spread into the elastic myofascial tissues to load elastic energy, which can then assist with the recovery movement.’

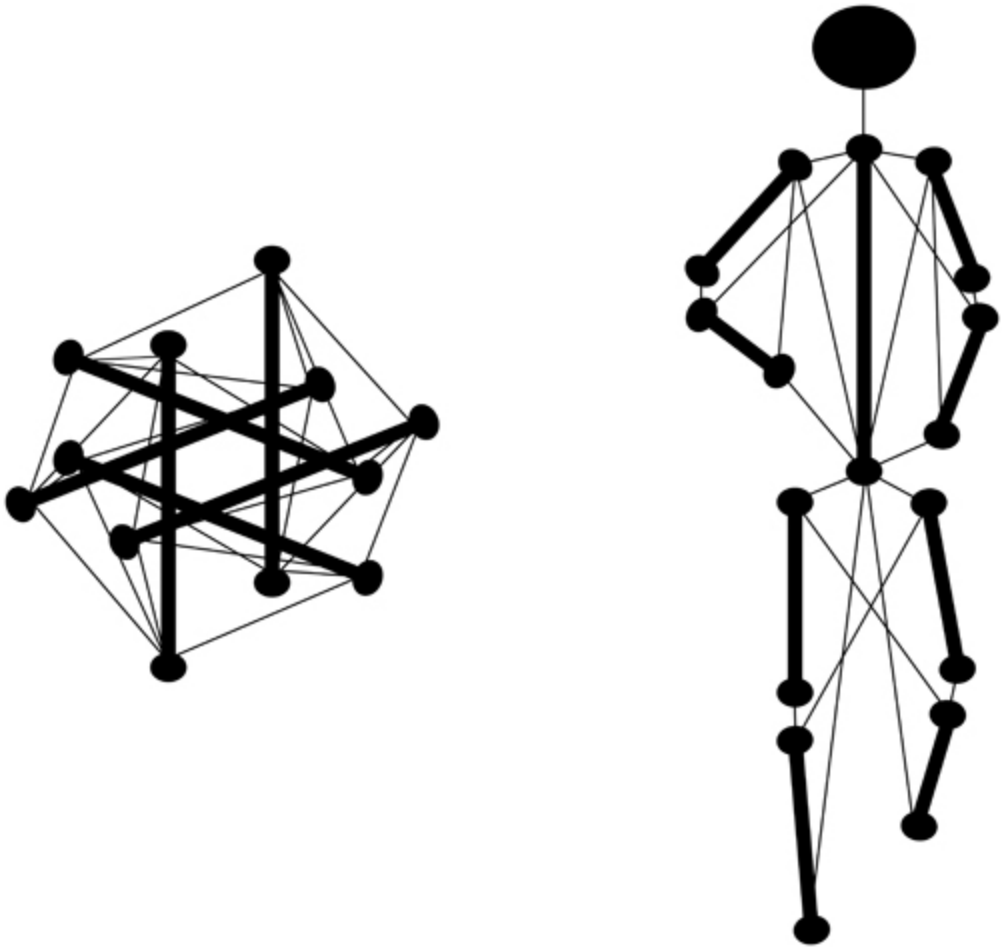
It was the fact of being a tensegrity system that helped us be more efficient. It allowed our bodies to be stretchy and even bouncy, a theory that is quite different from the image of the skeleton supporting us and moving by way of a mechanical lever system, which is the biomechanics view.

To bring this to life, James asked us to imagine how it would feel if the impact shocks from movement were only absorbed by the bones in our body. It would not be comfortable.

‘In fact,’ he observed, ‘we would feel like a large sack of potatoes.’

James then provided the second ‘wow’ moment of the day, producing a tensegrity model made up of painted wooden dowels held together by tightly strung elastic cord. What at first glance appeared to be a children’s toy (which it is!) was also the perfect vehicle for understanding tensegrity in our body and the relationship between our bones (the wooden dowels) and our elastic system (our fascia and muscles, represented by the elastic cord). You could pull the elastic back and forth to create a fluid motion. If you stretched the model, it recoiled back to its original position. If you compressed it, it created a spring effect. If you tried to pull it apart, its strength was surprising.

Since that day, whenever I am coaching I’m never more than a metre away from a tensegrity model. It is by far and away the best demonstration of our potential to be elastic, synergistic, fluid and connected in our movement.



‘Tensegrity’ and it’s elastic infl uence over our skeleton

I left the session to a parking fine and a clear sense that I had made a massive breakthrough. Now I had to try to find the answer to the obvious next question: if we have this incredible system, how do we best take advantage of it as runners? And is it the case that most of us do not?

I was seeing running – and, most importantly, movement – with a brand new eye. I was ready to return to Africa. Only this time, I decided that I would go to where the big boys and girls were learning their trade. My next destination had to be Iten.

ITEN, KENYA

His jacket flew through the air and stuck to my head like a fly squishing violently against a fast-moving windscreen. For a moment I couldn't see a thing as the 4x4 continued to plough forwards, hitting every bump and pothole along the rough, barren terrain that we were covering. I felt the sweat that dripped from the jacket's sodden material run down my face and then down the back of my neck. I grimaced. I was perspiring quite enough myself without adding someone else's sweat to the mix! I peeled the jacket slowly off my skin, trying not to breathe in, and threw it into the back of the truck on to a pile of similarly soaked garments that I'd collected that morning.

We were 20km into the morning tempo run. The 4x4 accelerated just a little to move alongside the owner of the now-discarded jacket. I had his carefully labelled water bottle lined up on the dashboard with dozens of others and I reached forwards and passed it out of the window. It was vital that I got the right bottle to the right person. It was also vital that, in passing it to him, I didn't cause him to break his stride or hesitate in any way, as any dropping of pace would be noted by his eagle-eyed coach – who was sitting at the wheel beside me – and may count against him.

The job I was doing (catching clothing with my head and handing out water) was normally done by one of the local boys, yet I found the whole experience quite stressful. In Iten, at an altitude of 2400m, there's a real bite to the air when the athletes gather for their first session at five in the morning. As fast as they may be, the heat of the day soon catches up and they need to shed kit and take on plenty of fluids. I was their conduit. I was earning my place on the team as a shotgun-riding, water-carrying, sweaty-kit-gathering operative but, of course, that wasn't why I was there. My reward was the opportunity to video the runners and gather data from them.

And to witness these incredible runners in motion was more than ample compensation. With a camera in one hand and a water bottle in the other, I was living proof that our species can adapt very quickly when necessary. Not only had I learned to multitask (impressive, considering my gender) but I also eventually became extremely adept at dodging flying garments – if you touch something that's hot, you don't touch it again. If someone throws a sweaty item of clothing at your head, next time you duck!

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Situated in the Rift Valley province in the western highlands of Kenya, Iten was, at least at first glance, like many other villages and towns in this region. Small stone-built houses lay scattered among the rolling countryside, most of the local people were hard-working farmers and labourers trailing their animals through the streets and the standard of living was extremely modest. However, on entering Iten, there's a clue to why the eye of the world had relatively recently started to focus upon the town: an arch over the recently laid road marking the entrance, the colour of which matched the deep red of the dirt tracks surrounding it. On top of the arch was the outline of a cockerel and the top bar was emblazoned in white text with a bold but appropriate statement: 'Welcome to Iten. Home of Champions.'

Iten has become world renowned as the cradle of Kenyan distance running, a sport that the country has dominated in recent times. The incredible story of this small town, which has led to 34 world champions, 35 Olympians, 12 world records, 12 Olympic medallists and 6 Olympic golds (and counting), is credited as starting in the mid-1970s with the arrival of an Irish national named Brother Colm O'Connell. Brother Colm arrived with the aim of staying in Iten for three months to teach geography to the local school children. He has lived there ever since.

As a teacher – and eventually the headmaster – of St Patrick's High School, Brother Colm used to arrange holiday running camps for his students and runners from elsewhere in Kenya. Originally for girls, it soon became clear that the area was a hotbed of running talent and the camps grew. Famously, the school staff began to plant trees each time one of its runners had success at a race abroad. A few years later, the school grounds

were abundant with blossoming trees. Such is his contribution to the area that the street that runs up to the boys' school is now named O'Connell Street.

Throughout the success that the area has woven in recent times, Brother Colm has been the common thread. When he arrived in the village, people didn't understand why you would run around in a circle on a track. They would run to collect something or if they had a place to be but they did not comprehend the concept of running for running's sake.

If I was going to understand the secret of this area, Brother Colm was someone I needed to talk to. If I could tap into his knowledge and work with his current crop of talented runners, I would surely be a better coach. He had been here from the beginning and could give me the biggest insights into why Iten has been such a platform for success. For decades, he had coached some of the greatest distance runners on the planet, including David Rudisha, a two-times Olympic champion, two-times world champion and 500m and 800m world record holder.

The problem was that the 'Godfather of Kenyan Running', as he had affectionately become known, was notoriously reclusive. He was not a man comfortable in the spotlight, even if that light had increasingly sought him out over the years.

I was just another researcher. Just another coach. Just another hanger-on wishing to be in his presence. I emailed. I made enquiries. I even went to the school in the hope of a chance encounter. Every time, though, the response was a disappointingly stony silence.

I left Kenya without even seeing the elusive Irishman once, let alone mining him for information.

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Since the early days of Brother Colm's camps, many alternative running camps had appeared in Iten. These offered an opportunity for many more Kenyan athletes to dedicate themselves to training – to live with other runners and to run every day, with the hope of succeeding on the world stage. An increasing number of top athletes also came from further afield, no doubt because of the high altitude and climate but also because, due to its reputation for producing such successful athletes, there was a desire to

plug into whatever it was that contributed to Iten's success story. To feed off it. To hope that some of the magic would rub off.

Tom Payn, a British distance runner who had trained in Iten for many years and enjoyed great international success, introduced me to sports management company Run Fast, which owned one of the more recently established high-altitude training camps in Iten. The Run Fast camp was significant for me because I had been able to persuade them to allow me to spend time there. This was, therefore, my ticket to live and train with some of the athletes based in the camp. All of the time I was there, I would become their shadow. When they went out for a run, I was there beside them, travelling in the 4x4, filming and handing out their water. When they sat down to eat, I was there to join them – socialising and chatting and, most importantly, trying to gain an insight into what they knew about why they were so good at running. I would analyse this from all angles. If there was simply something in the water that made these individuals such great athletes, I was a waiting sponge.

The running camps were not like Bekoji, where people went back to their homes at the end of the day. This was more structured. More serious. The runners stayed in a locked compound with high fences. This was to keep people out rather than the runners in but, in any event, none of the runners wanted to leave. Not unless it was with a ticket to run in a major city marathon in their hand and the chance to compete for the lucrative – and, for them, life-changing – prize money attached to these races.

The Run Fast camp – like the others in Iten – was simple. The athletes stayed in rows of single-storey concrete rooms, each with a door, a small window, bunk beds, a sink, a shower hose and a bucket to wash in. The runners, typically living four to a room, kept themselves to their bunk and stored everything they owned in a suitcase. This compound was where they lived, where they ate and where they slept. Outside the row of dorms was a basic concrete block containing squat toilets and a shed where food was prepared. There was also an outside communal area where the athletes could gather and eat.

What I witnessed was a very dedicated, almost monastic, existence. The athletes ran in the mornings, ate and then slept or rested, only rising to clean their trainers – which they looked after fastidiously, even though, in some

cases, they were old and worn – before an early evening shake-down run, some food and sleep. Then the cycle started again.

This was a stark contrast to how most runners at home not only trained but to how they lived. While they did a lot of running, these guys and girls also knew how to rest. It's something that in the Western world we would find it hard to replicate with so few people able to make a living out of running. Rest and recovery is something we aren't very good at, largely because of the busy lives we adopt and, in most cases, because we have to work.

What I could also clearly see among the drink bottles and flying jackets was consistently good movement. And, of course, from filming and analysing so many runners here and previously in Bekoji, I was now beginning to truly understand what good movement was. With such consistency apparent in so many runners, I wanted to discover what they knew about the way that they were moving and, most importantly, whether they knew about the elastic system that – at least to my eye – they seemed to be so effectively utilising.

I asked everyone I got in front of about their movement. The sub-two hour five minute marathon runners – who, perhaps startlingly, were not at all hard to find in Iten – and those less fast runners who would take a whole 25 minutes longer to run 26.2 miles! Some looked genuinely confused by the question; some put it down to the 'Will of God', others said it was because of *ugali* (a staple food here made of maize flour and water); the power from their fellow runners or just because 'it's what [they] were born to do'.

What became very clear very quickly was that these athletes were not being taught to move using a deeply considered philosophy. They weren't following any specific guidelines at all. Like most of us, they just ran.

You could take this as a negative. A sign that my search for the secrets of these incredible runners had hit a hard stop before it had barely got going. That nobody knew them – they just either had it or they didn't. But I was actually hugely excited by the lack of response. The fact that these athletes were not being taught to move with elasticity led me to believe one thing: as people, they had simply never forgotten how to run. Their movement, which was so deeply rooted in time, remained far closer to our ancestors' than the movement of the runners whom I was coaching back at home. And

this theory was reinforced by the answers I received when I asked these runners – and one in particular – how they perceived their movement.

Wilson Kipsang was, at that time, the king of distance running. He ran 2 hours 3 minutes and 23 seconds at Berlin in 2013 to set a new marathon world record. Among many other achievements, he also notched up wins at the marathons in London (twice), Frankfurt (twice), New York and Tokyo.

I was very fortunate to spend some time with Wilson in Iten and our sessions together gave me a huge insight into what good form looked like. The footage that I took of him running – with such grace and beauty – has become a regular feature in my coaching. His chest out and his legs cycling beneath him. His arms driving in perfect synchronisation with his legs and his eyes always on the horizon. Like the majority of other runners I encountered here, he had never had any coaching on his running form, but it was when I asked Wilson to explain his running to me that I realised that our perception of our movement is vitally important to how we actually move.

'I run tall,' he told me. 'It makes me stretchy so that I can run fast.'

Wilson's perception of how he moved was clearly linked to elasticity and the benefits of getting his body into a tall position in order to take advantage of this. And it truly showed in his movement. This excited me far more than the idea that he had been coached to move this way.

As I left Kenya, I knew that here, as well as in Bekoji, I had witnessed people running as our species was intended to run. However, what I still hadn't really worked out was *why* these African runners were able to so naturally take advantage of their elastic system when I was seeing so many runners around the world who didn't. I needed to figure out whether it was something they were simply born with or whether there's a chance that the people I was coaching back at home could move like that too. And if they could, why they didn't.

Given what I'd seen in terms of our corresponding existences, one particular thread I needed to now follow was not just whether the elasticity and tensegrity model applied to how people run but whether it also applied to how people live. And, more importantly, how much the way we live has an influence on the way we move.

UGANDA

What is the purpose of life? To be happy? To have a successful career? To fall in love? To achieve something that people will remember you for? These are all desires and aspirations, perhaps, but being completely base about it, our ‘purpose’ is something more functional. If you examine humans as a species, we are designed to survive and to breed so that our species survives.

Modern trappings have set us on a path that prioritises money and materialism because the survival of our species is no longer a primary concern for the vast majority. As a general rule, food is plentiful and available without effort or hardship on our part and, in relative terms, many in the Western world live in extreme comfort. Life expectancy is high and we don’t seem to have any trouble adding to our already vast population.

Our functions and habits now revolve around something entirely different from those functions and habits for which our bodies evolved. Many of us work in offices and sit at desks; we commute sitting down; we eat conveniently from packets; we have invented countless ways to move ourselves that involve little to no effort on our part. Our standard position is slumped over a computer for eight hours a day, huddled over a mobile phone while sitting on a train or slouched on the sofa in front of the TV to unwind before we lie down to sleep. Walk around any major city in the modern world these days and people can barely lift their eyes up from their phones for long enough to look where they are going, let alone consider what constantly craning their neck towards their mobile is doing to their posture.

Human bodies adapted to hunt for food in packs by chasing it down over long distances. When the earth warmed and the abundant rainforests receded, this is what marked our species apart. Persistence hunting was the

key reason why our ancestors thrived above the otherwise stronger and smarter Neanderthals. As the paleoanthropologist Daniel Lieberman put it, the first professional athletes were hunter-gatherers.

For most of us, our bodies have adapted to modern life and our movement has therefore radically changed. We are no longer primal. Our bodies are no longer primed to do what they once needed to do in order to survive.

The trappings of the post-Industrial Revolution Western world are making this change in our movement more extreme. With a plentiful supply of everything we need close to hand, we have learned to sit more, move less and eat from a packet. In terms of how we utilise our species' natural ability to move efficiently over long distances, we have lost our way on a dramatic scale.

When I first travelled to Africa, I found people who had not lost touch with the attributes that made our species so strong. They did not teach movement with any deeply considered philosophy, and the way the human species evolved to move, which is deeply rooted in time, had survived there. Of course, I'd chosen my locations intentionally. Bekoji and Iten were two of the powerhouses of modern running and arguably the obvious places in which to find people who had not encountered the negative habits that we were seeing in the Western world. Those I spent time with did not sit at desks all day or spend countless hours writing emails and tapping out messages on a mobile phone. They used their bodies in the way that they were designed to be used and when they moved, it showed.

What I wanted to now do was visit a different part of Africa to see whether it was nature that made Africans such great runners – whether it was in their DNA, as some might argue – or whether it was more about nurture and the fact that, in places like Bekoji, many people had simply never forgotten how to move.

I flew to Entebbe and then drove to Kampala, the bustling capital city of Uganda. With a population of more than two million, I chose this place because, just like in the majority of towns and cities at home, the white collars are as prevalent as the blue, and office work and modern trappings took hold many years ago.

As soon as I got down to work and analysed the runners here it was immediately apparent that the movement of people in Kampala was starkly different to that of the people I'd come across in Bekoji and Iten. None of

the elasticity or fluidity was there. What I found wasn't horrific or deeply set but there was a notable difference.

However, I wasn't entirely satisfied that this proved the point. I was still comparing office workers with sub-2.05 marathoners. I therefore drove three or four hours out of the city.

Located approximately 87 miles south-west of Kampala – along the infamously dangerous Kampala–Masaka highway – is the small town of Masaka. With a population of just over 100,000, it's a world away from the busy metropolis of Kampala.

What I found was that the people in Masaka, who were farmers and labourers rather than runners or city workers, moved with far more fluidity and were far closer to the athletes in Bekoji and Iten in the way that they ran than anyone I had seen in Kampala.

This confirmed my suspicions, and my research on more than 3000 runners and indigenous people ever since has done nothing to dissuade me from this: the way we live has a defining influence on the way we move. What's more, it happens in a far more alarming fashion than most people think.

I guess this shouldn't be breaking news. The things that gave the human species the edge in the battle for survival many thousands of years ago are no longer necessary for us to survive and the way we move has changed as a result. Running efficiently over long distances is something our species excels at. It's what set us apart in our days as athletic persistence hunters. Yet so many of us have simply never needed to rely on this, let alone had the desire to try it. If we barely move our bodies during the day, is it any wonder that, when we do lace up our trainers and decide to go for a run, we are simply not primed for the task? We no longer live as our species evolved to live so why should we expect to move as our species evolved to move?

If you take someone who has been locked in a dark room for hours and bring them out into the light, their eyes will find it difficult to adjust and they will squint and shield their faces, unable to focus. With so many people, when we go out for a run, the same situation arises but on a much greater scale. The body, which has been largely dormant all day, is sleeping. To suddenly be thrown into action, with all of the vigour that this entails, takes a massive adjustment. The body's natural inclination is to take up the

position that it's used to. Commonly, because this is how we sit, this means we run with our heads down, shoulders hunched forwards and bending forwards at the waist.

What James Earls was demonstrating with that piece of elastic was that, if we put height in the body, we create tension in the elastic system, which then allows recoil to happen. This allows us to be fluid, elastic, synergistic and connected in our movement. Equally, if we don't engage our elastic system then we can't create the necessary tension and, just like an elastic band that lies dormant on a desk, our elastic system will sag and flop and be largely ineffective. We shuffle, we strain and we give it some proper welly, but without taking advantage of the natural elasticity that our fascial system creates and without engaging our body's natural sea of tension, our muscles take the strain, acting like scaffolding for our skeleton and more rapidly tire – and often injure – in the process.

Our everyday existence encourages a slumped posture, so it is little wonder that we find it hard to run beautifully tall and with elasticity when we finally get up from our chair to run. I started this journey because I wanted to help people avoid these common habits and mistakes, some of which I was making – because they lead to injury and inefficiencies, inhibit performance and squash our potential. I was starting to realise the scale of this challenge.

Back in England, the importance of my research in Uganda really hit home. Everywhere I looked in the UK there was an epidemic of poor running form. I was now confident that this was linked to 'negative nurture' – a process by which how we lived, how we used our bodies and how we perceived our movement combined catastrophically to have a defining impact on how we moved. In the Western world, we had gone so far away from using our bodies as nature intended that, as a general rule, we simply didn't move in an elastic way any more. If bad posture caused by how we lived our lives were a disease, then what I was seeing was quite frankly a pandemic. And one that was spreading in an alarming fashion.

The aforementioned Daniel Lieberman, author of the seminal text *The Story Of The Human Body*, basically concluded that as we evolve, we 'use it or lose it'. So, while I was certain that I'd started to unlock the secrets of the runners who moved as our species was intended to move, my focus had quickly shifted to a far greater concern.

What if, as a result of the way we lived, it wasn’t just the case that we’d lost our way? What if, for the vast majority of the Western world, it was already too late?

PARKRUN, CARDIFF

Hope. It can be a powerful motivator. When it seems like we are down and out – when we've hit rock bottom – even a small glimmer of it is enough to start us climbing back up. I have seen incredible examples of human resilience in my work. I've been a very small part of some epic battles to overcome serious adversities that have fundamentally challenged those individuals' ability to move. Those people have all relied on a sliver of hope that one day they might run again. They have all harnessed that to fuel a strength and resilience to somehow defy the odds that are overwhelmingly stacked against them. On my journey to discover whether we could change the way we move, that, in itself, gave me hope.

Rory Coleman has completed more footraces than I've had in-flight meals. After giving up drinking and smoking in his early 30s, Rory started running a marathon a weekend and soon progressed to longer, more extreme challenges. He has finished more than 1000 marathons, over 250 ultramarathons, held 9 separate Guinness World Records and once covered the 1275 miles from London to Lisbon in 43 days on foot, arriving in time for the European Championships football tournament in 2004. Rory also became a regular fixture at the Marathon des Sables (MdS) – with 15 finishes to his name – and coached and guided Sir Ranulph Fiennes during his successful attempt to complete the race.

I first worked with Rory shortly before he went out to his 13th MdS. The next time we met was on a track in Bristol about a year later. It was clear that a lot had happened to him in the relatively short time in between.

Everyone has their Everest. Something that, relative to their capabilities, requires them to push their boundaries, both physically and mentally, to the max. Something they are not sure that they can even achieve. For Rory, there appeared to be very few limitations. The more extreme, the better. He

was the ‘marathon man’ for whom completing 26.2 miles in one go, which for many is a lifetime achievement, was a weekly occurrence. He wouldn’t think anything of embarking on a 100-mile-plus ultramarathon in an extreme environment. Yet, rather suddenly, his horizons had been dramatically lowered. His Everest suddenly became a single 5km loop around a local park.

‘It was early September 2016. The April before I’d been out to my 14th Marathon des Sables in the Sahara desert. Shortly before I headed out to Morocco, I’d made a short running film in London and I’d driven down from Cardiff. I’m someone who is almost never ill. I’ve been injury free throughout my running career. That day, though, I felt dreadful. The discomfort eventually turned into a tummy upset but, as it was too late to get an appointment with my GP, I headed out to North Africa and immediately got some medication when I arrived at camp. It pretty much cleared up and I cracked on with the race.

‘Looking back, the signs were there. 2016 was a tough MdS and I found it hard to run. At the time I put it down to the particularly difficult course that had been chosen for this edition. On the marathon day, it was 5k into the finish on a nice runnable section so I decided to put the hammer down. I caught up with a French runner and, before I knew it, we were jostling for position and going toe to toe into the finish. Not only did he just beat me to the line – which was unexpected given the speed at which I’d approached him – but I couldn’t catch my breath when we stopped. This lasted for half an hour and my oxygen levels dipped to 88 per cent saturation. The medics gave me some oxygen and, once my stats improved, I went back to my tent and got on with the race, chastising myself for being goaded into a sprint finish.

‘When I returned to the UK, I’d promised my wife, Jenny, a holiday. We went off to a nice hotel in Malvern for a weekend. To me, the large luxurious bed in our room might as well have been a bed of nails. It was the most uncomfortable platform that I’d ever slept on. My back felt like it was on fire. When I got home, I went to A&E and they gave me some painkillers. It got worse. I went back and they gave me something stronger. I was in agony and swaying down the road when I went out of the house. I must have looked like a drunk! I phoned my GP and he said “If you can get here in the next five minutes, I’ll see you”. I drove there but, as I got to the

car park, my feet wouldn't work on the pedals. After parking using a less than textbook manoeuvre involving the handbrake, I went in. The doctor said that he thought I had something called Guillain–Barré Syndrome. He told me to go to hospital. I said I'd grab a bag and get Jenny to drive me.

'''Don't go home," he said. "You need to go straight there. This condition kills 7 per cent of people within two hours.''

'I made it to the hospital. By that evening, I was paralysed.'

Guillain–Barré Syndrome is an extremely rare condition. It manifests itself when the immune system attempts to attack germs (in Rory's case, those causing the stomach bug) but mistakenly attacks the nervous system instead. Our nervous system is so deeply connected to our movement and senses that, without it, we simply cannot function.

'It's like being dipped in anaesthetic,' Rory explained. 'Your body and brain just go numb.'

Rory was in bed for a month – an extreme challenge for a man who was so used to being incredibly active.

'I was a complete pain in the backside. I was Rory Coleman the runner not Rory Coleman the patient. The ward was on the fourth floor and I would still have dug a tunnel if I could have moved my arms! Sadly, I couldn't. Nor my legs. I was on liquid morphine for the pain.

'I just kept asking if I could go home. They said, "If you can get to the end of the ward on a zimmer frame, you can go. And actually, we'd be quite happy if you did!''

'That became my goal. I'm not quite sure how but eventually I managed to do it and blagged my way out. We went to live with Jenny's parents and I continued to be a nightmare. I couldn't move but each day I thought, "When I wake up tomorrow, I'll be able to walk." I thought I'd do a few laps of the park and everything would be brilliant. Only every day when I woke up, it wasn't. In fact, it got a lot worse.

'I regressed so far that, four weeks later, I actually phoned the hospital and asked if they'd take me back. They confirmed that the GBS had returned and it was worse than before. I couldn't move. I had no working bodily functions whatsoever.

'When you take on extreme challenges, you inevitably find yourself in some pretty difficult scrapes. I've had my fair share. This, however, was by

far the biggest scrape I'd ever encountered. It occurred to me that I may never recover.'

That's when Rory had to rely on his strong mental toughness, determination and that glimmer of hope to start the climb back up.

'First came acceptance. I'd seen lots of people in wheelchairs who had found purpose and happiness. And, to be honest, I knew a lot of very miserable ultra runners. I decided that if I was going to be in a wheelchair then I'd make the best of it. Having accepted it, I started to consider the alternative. This time, though, I did it in increments without the level of pressure or expectation that I'd had before. I supposed that if I could just stand up then I wouldn't necessarily have to be confined to a wheelchair. And if I could move a leg then I could perhaps turn that into a walk. And if I could walk … well, then surely I could run! I was stuck on 976 marathons. I was determined to get to a thousand. I was booked into MdS the following year. I had my heart set on going back to the Sahara. These goals became my magnet.

'When I was running, I could feel every grain of sand under my feet. It was like a pianist moving their fingers across those ivory keys. I just knew what I was doing and was totally immersed and in my element. I had a touch. We are all designed to run but we just sit at desks all day and write emails. And for me, it's not about marathon times, it's about how it makes me feel. That feeling was taken away from me. GBS robbed me of a huge part of my identity. It took away my therapy. I knew that I would fight like anything to get it back.'

We have a quarter of a million nerve endings in the sole of one foot. If our nerves are damaged, our senses are affected and our proprioception (which is our innate ability to sense the orientation of our body in its environment) is thrown. GBS destabilises the body. It fries the nerves, meaning that your quads and glutes might work fine but your hamstrings and calves could be completely inactive.

Working with Rory truly underlined a vital message: our movement is not something we think about any more. Not unless we have to. For most of us, changing our movement involves, at least as a first step, a shift in mindset. We need to engage our brains in the process. For Rory, it involved that and a whole lot more. He had forgotten how to run. In fact, he'd forgotten how to walk and even how to write.

‘When someone told me that I would have to learn to walk again,’ he explained, ‘I realised that, as much as there was nothing wrong with my memory, I had absolutely no idea what I used to do when I walked. You may think it’s as simple as putting one foot out in front of the other. It isn’t. Every intricate action required to move us forwards is so ingrained in adult humans that we don’t need to engage our brains in order to make it happen. When we are required to look to our minds for answers on how we did it, we just draw a blank. I guess for most of our lives, the brain isn’t directly involved in the process so why would it know!

‘This realisation could not be starker than when trying to walk between the parallel bars that the hospital used. There are people all around you shouting instructions on what to do next – “twist your knee”, “move your hip”, “angle your foot” – it’s completely overwhelming. I ended up walking like a catwalk model, pushing my hips forwards in order to gain some sort of forward momentum. This was basically cheating.

‘In hospital, I was given five minutes of physio a day. They used the time to teach me how to get from my wheelchair and into a car so that they could sign me off and send me home. I didn’t care about any of that. I’d crawl into the bloody car if I had to. I wanted to run.’

It was in between these sessions that Rory found a surprising source of inspiration and his ability to dig deep was underlined.

‘Over the course of the following weekend, it was pure determination and Phil Collins that got me to my feet. I would stand up on the zimmer frame with shaking arms taking about 60 per cent of my bodyweight, and I’d hold myself there for the whole glorious 4 minutes and 20 seconds of “Only You Know And I Know” and then sit down. I went through this routine over and over again. Each time with the same resolve. Each time with the same song.’

Twenty-one days later, with Phil still blasting out of his headphones, Rory managed to take four steps.

‘The doctors said I couldn’t do steps yet as they still hadn’t signed me off! I didn’t care. I got a friend to visit me and he sneaked me out of the hospital and down to a local park for a few hours. I did 100 steps across the park. Two days later I walked just over a mile home.’

In what was an incredible and unlikely transformation, that weekend Rory found himself toeing the line at the Cardiff parkrun.

‘Five kilometres is the shortest distance I’ve ever raced. I’ve done 100-mile races and run between countries. I’ve always been prepared to suffer but I’ve always believed I could get to the end. Yet, this parkrun was the first race that I’d started where I seriously had to question whether I could physically finish. With the kids cheering from their stroller and Jenny pushing them along by my side, I was determined to give it a bloody good go.’

The parkrun movement has been sensational and this must be one of the best in the UK, both in terms of popularity and atmosphere. About 900 people lined up alongside Rory that day. Parkrun was established in 2004 as a way of encouraging people of all ages and abilities to come together on a Saturday morning to run 5km around a local park. What started in Bushy Park in London with a small collection of people has expanded into 20 countries across five continents. More than five million people have taken part in a parkrun. For some, it is a huge challenge to just put on some trainers and gym clothes and run that distance. For Rory, it had always been a flat-out, heart-in-mouth, fast-paced time trial and he hated it. Give him a leisurely 140-mile ultra any day of the week! Now, though, he was desperate to just get around.

‘As soon as we started I was trailing behind two ladies who were clearly out to walk and occasionally jog their way around as best they could. The only person I was in front of was Des, the back marker. The ladies immediately caught my eye as the crowd disappeared ahead of me. If I was racing – which, let’s face it, I was programmed to do – then they were my most likely opponents.

‘Every now and then, they would walk and I would overtake them, thinking “brilliant!” Every time, Des would go, “Come on girls, let’s run!” and they would pass me again. We traded places until the last 100m when Des rallied them into an enthusiastic finish. I crossed the line after 58 minutes. I was broken. I had no stability whatsoever and very nearly fell to the floor. Jenny was crying. The kids were shouting for me and everyone around me hugged me or patted me on the back. I think they took my silence and slightly distant stare to be a way of holding back the tears. It should have been a hugely emotional moment. But all I kept thinking was, “Shit. I was last!’’

‘I guess, at least on one level, that was a sign that I was back.’

There is a lot we can take away from this. Most of us run on autopilot and do not engage our brain in the process. As a result, all of our habits are reflected in our movement. All of our daily idiosyncrasies come out. We need to get involved again. Perception of our movement has a huge influence on how we run.

Human resilience can defy the odds. When I met up with him on the track in Bristol, Rory, his own admission, resembled a fast-moving Frankenstein. He was running with straight legs. He had no plantarflexion and very little dorsiflexion. Yet he was moving again. He had managed to relearn and adapt. Considering what he had been through, that was incredible. Something I really noticed (and it is something I have seen in other people I have worked with who have suffered trauma) is that he was standing bent from the waist, almost like he was closing in to protect his vital organs. As a result of this, Rory was running bent forwards at the waist. When I showed him the video footage of him standing and moving, he was shocked to see it. We worked on getting him upright, without that forward bend, trying to wake up those dormant muscles. With time and tenaciousness, he has since hugely improved.

'When I first start to run, it's still odd but after an hour there's muscle memory and I become a runner again. It's just that I'm not at the start. I have to think about how I move. Even now that I am down to 25 minutes for a parkrun, I'm nowhere near where I was. Sometimes, I still can't tell where my feet are. I have fallen over several times. I broke my shoulder on one occasion. It's like I'm running in the dark and don't know where the floor is. But, to put it into perspective, I know lots of people with GBS who are 10 years on and still in a wheelchair.'

The Cardiff parkrun was in early September. Rory did the Cardiff Half Marathon in early October and by the end of that same month, he finished the incredibly lumpy Beachy Head Marathon. In April of the following year, he stood on a jebel more than 1000m high looking over the vast Saharan desert at his 15th Marathon des Sables and he had a moment.

'I never thought I'd see the place again,' he told me. 'That's what GBS does to you. It lowers your horizons.'

For a man who hated a parkrun, he is now the first to suggest that the family get out to one even on a cold, wet Saturday morning in January. 'I'm always glad that I did it,' he told me. 'It wakes you up and gets you moving.

Plus, you will always appreciate being able to travel 5km under your own steam when your ability to move even 5m has been taken away.'

I was inspired. Granted, it was through grit, determination and bloody-mindedness, but if Rory could rediscover his ability to walk and run from the depths of the extreme paralysis that he had experienced, surely, by taking ownership of our own destiny, we could all change the way we move.

And, on that note, while I was still finding an overwhelming number of people who were struggling with their movement, I was also starting to find examples of runners born and bred at home who were bucking that trend.

YORKSHIRE, ENGLAND

It’s not every day that my movement sessions are delayed by a runner who has to deliver a calf from a labouring cow. But then, it’s not every day that I work with Nicky Spinks.

Nicky is a record-breaking fell and ultra runner. She is known for her tenacity and endurance, having (among many other achievements) at one stage held the women’s record for all three of the classic British mountain ‘Rounds’ – the Bob Graham Round in the English Lake District (a 42-peak, 66-mile traverse with over 27,000 feet of ascent), the Ramsay Round in Scotland (24 peaks over 58 miles with around 28,500 feet of ascent) and the Paddy Buckley Round in Wales (with 47 tops over 61 miles and taking in 28,000 feet of ascent).

As if that wasn’t enough, Nicky then took the respective records for completing doubles (yes, that’s twice around without stopping!) of each of those Rounds and, in the case of both the Ramsay and Paddy Buckley rounds, becoming the first person ever to achieve such a feat.

Between fruitful trips to Africa, my search for the lost art of running was producing slim pickings at home. In fact, the only thing I was cultivating was a growing concern about the movement of the runners that I was analysing. So many individuals turned up to their first session with a host of idiosyncratic movements that were clearly linked to the way they were living their lives – predominantly caused by sitting at a desk all day – and very few were even aware there was an issue.

In Uganda, I had analysed both office workers and those working in agriculture. Now what I wanted to see was whether the nine-to-five negative nurture that I was discovering in so many people in the UK was still present in athletes who spent most of their days being active rather than sitting at a desk.

That's why I was excited about working with Nicky. Despite all that she had achieved in the sport, running wasn't her day job. Instead, she fitted her training around long, physically demanding days running a farm with her husband in Mirfield, Yorkshire. If she ever wrote a book, she told me, it would have to be called *Head in the Hills, Feet in the Cow Pat*!

In our first session (after dusting herself down and removing the straw from her running kit following the safe delivery of that calf) Nicky was, moments later, running up and down a hill asking me if her movement was OK. And it was. She moved gracefully and with real efficiency on those hills. This was her natural environment – where she worked and where she played – and her love for moving on this terrain really showed. As we discussed her movement it became clear that, over the years, she had also been able to perfect her technique.

'It was back in 2006,' Nicky explained. 'Having completed the Bob Graham Round in 2005 in 23.32 hours, I was looking for a greater challenge and found it in the Paddy Buckley. But the first time I descended Tryfan directly down to Glandana I knew I had something to improve. The descent, on the schedule, is supposed to take 35 minutes. It took me an hour. I came out in a cold sweat then heel planted and quad busted my body all the way down it. And that was just one Welsh mountain descent of many! So, over the next few months and years I practised descending. I never felt like I was flowing but I had gained experience and practice while recceing the Paddy Buckley and doing races with long descents over technical terrain. I thought that, to save my quads, I had to descend more gently so I never pelted down the hillside like many runners. Even as I got used to the technique, I still suffered from solid, sore quads after long races and even after short, flat-out races.'

It was during the summer of 2016, though, while completing a British Athletics Fell and Mountain Coach in Running Fitness course, that Nicky started to hone her downhill technique.

'The course was very in-depth,' she told me. 'We learned about descending steep gradients and watched videos of people doing it properly. It was during this course that the penny dropped. You are supposed to land on a full foot and not heel plant! Your hips are supposed to be high and your leading leg needs to go through and under you. It was a huge moment

because, as soon as I understood the technique, it was a matter of putting theory into practice.

‘Over the following months I practised. Initially, only on very slight gradients and only when the grass was nice and smooth, but it was very much my mind that was holding me back. I used to say “Let go” to myself, meaning relax, think “high hips, leg coming through”. It was scary and felt out of control. I could only do it for a few steps before self-preservation kicked in and I would resort to braking hard and heel planting. But eventually I got more confident. My co-ordination and stability improved. When I strode out, I knew that my leading leg was going to stay straight and stable, allowing me to bring my trailing leg through under me. All of a sudden I was able to fly! Progression came gradually; as I got confident at one gradient I progressed to the next. It’s been a wonderful learning experience and now I can descend many mountains without my knees and quads complaining once.’

This resonated with so much of my journey. Just like the runners in Bekoji, Nicky was preparing her body on a daily basis in both her work and her running. Just like Rory, she had learned to take ownership of her movement and consciously address her technique. Thinking about it. Honing it.

All of this was fascinating but it was the next stage of our work together that opened the door to a more significant discovery. It came when we took Nicky out of her comfort zone. When she was asked to do something that she rarely did for fun. It was when I set her the task of running on the ‘dreaded flat’.

It was an alarming sea change. As soon as she hit the ground, her graceful and natural hill-running technique was replaced with an unrecognisable slumping trudge. At the time I was totally perplexed. How could such an elegant running style – one of the best I’d ever seen on a gradient – turn into this uninspiring plod just because the terrain had levelled out?

It was when I asked Nicky how she felt when she was running on the flat that the answer became abundantly clear.

‘I just don’t enjoy it,’ she complained. ‘It’s so boring. For me, it’s the worst part of running.’

This attitude was clearly reflected in her movement. It was like she was sulking.

We got to work, attempting to take Nicky's tall, elegant downhill running technique and apply it on the flat. Despite her protestations ('Yuk! OK, I'll try'), the key (I hoped) would be to change her mindset.

I told her that, if she moved well between the hills, she would increase her efficiency and speed and would therefore have more energy for the next ascent. Plus, if nothing else, she'd get the flat bit over with more quickly!

That seemed incentive enough. Nicky started to change her perception of lowland running – shifting her mindset by using a more positive approach. She started to think 'be upright' and 'be stretchy elastic'. It didn't happen overnight but she began to take ownership of her movement and, as a result, began to deploy a far more graceful running technique to all terrains.

The proof, though, would come in a race scenario where Nicky would need to remain positive despite the inevitable tiredness that comes later in a race. She entered the Drogo Ultra – a 36-mile race with only 1800m of ascent. Just to be clear, for Nicky, that's flat!

'It was an enjoyable route that crossed Dartmoor on the Two Moors way,' Nicky explained. 'Joining forces with two local lads (Jim and Dave), we helped motivate each other. They liked the fact that they were running with me and said it was a great experience as I was tired from a recent race and this was their first ultra! We chatted happily. That was until we came to a disused tramway! This was 30 miles into the race and, while initially we welcomed the flat (or gently climbing track), it soon became less than fun. My race companions were obviously road runners (you could tell by the way their heels nearly touched their bottoms) and set off at a quick lick. I stuck with them – all of the time thinking "Use your arms, keep your hips high, think elastic" and "Hey, it worked"! I was able to stay with them! Then after 3 miles came a gradient! Not enough to walk, just enough for tired legs to complain and the tedium to set in. We shared gels and water and Dave (with his fancy watch) said "It's only 4km to go" so on we went. We did 6 miles in the end, all at the same mind-numbing cadence. It was great! Running down to the finish, we were ecstatic. Me because I was finishing after 7.29 hours and going to the pub with all my family. And Jim and Dave because they had finished their first ultra. But best of all, I actually enjoyed that last section running on the flat.'

In my search to find people in the UK moving as our species is intended to move, analysing Nicky in the hills was like sifting through a thousand

grains of grey sand and finding a single speck of gold dust. She was an example of someone who used her body on a daily basis rather than sitting at a desk and was able to apply that to her love for fell and mountain running. She also gave me a clear insight into a hugely important factor that has become a key component of my coaching ever since: our perception of our movement has a profound impact on the way we actually move. If we think that we are bored or tired, we tend to slump. If we think that we are mechanical, we will be mechanical in our movement. If we think that we move without grace and are just thudding our way along the pavement, that will be mirrored by our movement. It follows, then, that if we think that we are tall, graceful, elastic, fluid, synergistic and connected, we are far more likely to display those attributes.

For all the bad form I was seeing on the streets and trails on a daily basis, I was at least finding some positives to cling on to. In that same vein was a rising star of ultra running. A young man who came to see me for some movement analysis and coaching, not from a position of injury or adversity but after becoming the first British male to place on the podium at a Marathon des Sables with a show-stopping third-place finish in 2017. At the time, it was like he had burst on to the ultra-running scene from nowhere. His star has only continued to rise ever since.

CHAMONIX, FRANCE

It was dark, yet the streets of Chamonix were filled to the rafters. Hundreds of people stood waiting in anticipation, the dormant cowbells in their hands occasionally rattling in the wind above the light chatter of the crowd. The huddle of photographers who were lined up behind the finishing line fidgeted nervously with their cameras. The giant timer clock continued to tick. We waited.

Then it hit us like a wave of noise. A distant buzz of anticipation building quickly into a deafening roar of excitement and ringing bells.

He was coming.

Ten hours and 44 minutes after leaving the Italian town of Courmayeur, Tom Evans rounded the corner and appeared on the home straight. He was moving like he'd just started his morning tempo run, smiling from ear to ear and springing along the road dressed in the bright-blue colours of his sponsors. He put his arms out like they were the wings of a plane and flew from one side of the crowd to the other, high-fiving outreaching hands as he went. Then, as he crossed the line, Tom looked up to the sky and offered his trademark salute. A salute that connected us to his past. A salute that signalled his continuity along the short, sharp, upward trajectory on which he had been travelling in the sport. He had just won the biggest race of his season. In fact, this was the most significant result of his emerging running career.

The days surrounding the Ultra-Trail du Mont Blanc (UTMB) are a carnival of mountain adventure. As trail running goes, it's the equivalent of the football World Cup. Runners from all over the world, including the very best elite athletes in the global ultra-running scene, congregate for seven days of epic racing.

Although a shorter race than the main UTMB, the CCC (which is named after the three most notable places on the route – Courmayeur, Champex and Chamonix – in three different countries) is no longer just its ‘little sister’. It has fast become a hugely competitive and prestigious competition in its own right. And with 101km of distance and more than 6500m of ascent, it’s no gentle day out in the mountains.

Having worked with Tom on his movement and analysed him several times in the lead-up, I was fortunate to be in Chamonix to witness the race unfold and to see this defining moment. Tom was racing against some fierce competition and – for the casual observer – it was a victory that, only a few hours earlier, had not looked likely.

‘The CCC starts with a long climb,’ Tom explained. ‘For someone like me who lives in Sussex and London, it’s not the most specific place to train for this kind of race. A lot of people say that you can’t possibly mix it up with the world’s best in the mountains if you aren’t training on them all the time. I like to disagree.

‘While that long climb was not my forte, I planned on keeping things comfortable and staying in the mix early on. Chinese runner Qi Min shot off like a bat out of hell and was 10 minutes up on the rest of us at the end of the climb. I was still in the mix and just where I wanted to be – jostling in the top 10 with experienced competitors like Marco De Gasperi and Pau Capell.

‘There were certain elements of the course where myself and my coach, Allison Benton, had planned that I would play to my strengths. A lot of my training is pace based and I hoped to fully exploit the more runnable sections. So, when I knew that I could open up, I really did.

‘Things were going well until the 35km mark. I was in third place and feeling good. However, at the highest point of the course, which is around 2800m above sea level, I started to feel pretty ill. A combination of being cold, too much water and the nerves had got to me and I couldn’t keep anything down. I had to dig in and ride out the bouts of vomiting. It was a case of just keeping moving. I managed to pull through about 10km later and was back on track but had slipped down to fifth position.’

At this point, I was concerned that Tom was too far behind to challenge the top three. However, as the race reached the critical stages, he cruised through the field. Fourth. Then third. Then second. Then there was just Qi

Min, who had been the race leader from the outset, between him and the top of the podium. And Tom had him in his sights.

‘At the start of the final climb I was in second place, only four minutes behind the lead runner. I had to dig deep to run the whole of the climb, catching him at the 94km mark.’

‘It certainly wasn’t my plan to become the leader with 7km to go but, when I got there, it gave me confidence that the runners I had been passing were struggling. People were walking because maybe they had gone outside of their comfort zone, having tried to push it too early, and because of that they were stressed and they were tense and they weren’t running elastically. They weren’t a beautiful runner.’

Something that I’d learned about Tom during the time we’d worked together was that he really grasped and understood that he had the potential to run with incredible elasticity. As we worked on his form, he started to consistently move into those lines of fascia and take full advantage of his elastic system. He believed it. He felt it. It showed clearly in his movement. We talked a lot and he became (and continues to be) a hard-working student of his movement. As a result of his great commitment to improving, his form began to resemble that of the runners I had analysed in Bekoji and Iten.

I could wish for no better example of this than as he accelerated past the race leader on the last big climb of the race and opened up into the long final descent. It was as if he was still completely fresh. It seemed effortless.

‘Something that I focus on when I think about racing is my technique. It may not make the biggest difference in the beginning but it shows as you get to the closing stages. If you’re there or thereabouts at the end of the race and you’ve given yourself the opportunity to do well, I think it’s where it really makes the difference.

‘Obviously, there were points when there was serious pain and it was hard, as it should be when you are really testing yourself and pushing to the limit of what your body is physically capable of. But as I reached that final descent, I knew it was now or never. It was about how much I wanted it. But that didn’t mean that it was time to tense up. Actually it was time to relax. I thought “Right, it’s downhill now. You know you are good at downhill, you know that you are efficient so just relax because the more you relax the quicker you will go.” It sounds counter-intuitive but it was a

case of “the less you try, the faster you will go”. A lot of people see it as the equivalent of the home straight and start working really hard but that’s when you throw the race away.’

Not only had Tom learned to take advantage of his elastic system, but he was also reaping the rewards in terms of his efficiency.

‘“Efficiency” is a word that is getting passed around a lot in marathon running but it isn’t talked about as much in ultra running, where people think you just need this massive engine. I think that efficiency is really important. If you can run quickly downhill just utilising your fascia and elasticity, then you are not burning any fuel and you are using minimal energy. You’re moving quickly but actually saving yourself for the bits where you need to dig in and work really hard later on in the race.

‘There’s an 18km downhill section on the CCC. While it’s hardly a measure of success, I totally cleaned up all of the Strava segments on that descent and I was totally relaxed and in control. Being efficient allowed me to get into the groove and check my body position.’

One of the things Tom and I worked on was a checklist that he could use during races to focus his mind on efficient movement and give him an opportunity to periodically touch base with his body and ensure he was moving well.

‘It takes about three minutes to do, which, when I’m working hard, is how long it takes me to run a kilometre,’ he explained.

‘I just work through the list: “What are my feet doing?”; “How am I landing?”; “What are my ankles doing?”; “Where are my knees in relation to my feet?”; “How much pressure are my quads taking?”; “How are my hips feeling?”; “Am I in the right position?”; “Do I have my chest out in front of myself?”; “What are my arms doing?”; “Where’s my neck?”; “Where’s my head?” It keeps me focused. With ultra running you are out for a long time and you can’t switch off. I see a lot of ultra runners using music to distract themselves and I wonder why they want to be distracted. I need to be at one with my body. At one with nature. That’s where I think you can really tap into your performance.

‘I honestly think that technique and efficiency are a crucial measure of success. If you have a pretty good VO_2 max, you are efficient and you have good elasticity, you are going to be crushing these races. I think a lot of

people only worry about one of those factors. Whenever I get asked about my fitness, it's always "What's your VO_2 max?" As it is, I have a reasonable VO_2 max. When I was tested at St Mary's University, it was high but not something that I would write home about. When they measured my efficiency, however, it was exactly the same as Paula Radcliffe's when she broke the marathon world record. That, for me, is the key to success and making good use of my elastic system is so important for efficiency.'

An area of focus during my work with Tom was his cadence. When he first came to see me, Tom was running at a cadence of between 165 and 170 steps per minute. While whatever he was doing was obviously working, I was convinced that there was untapped potential and that he would fly even more if he could get his cadence to around 180 steps per minute.

Tom worked hard to improve. He used a metronome for a few months and, over time, it made a massive difference. In 2017, he had finished third at the Marathon des Sables, fourth at the Eiger Trail and fourth at the CCC. In 2018, after nailing the average 180 cadence that he was seeking, his performances went to another level. He started winning races and setting course records, finishing third in the World Championships, winning the Coastal Challenge and the CCC and translating that to running quickly on the road as well, being selected to run for England in a road half marathon. He was taking his elastic running on to a variety of different terrains and excelling.

'You don't have to stereotype yourself into thinking that you are a trail runner or a road runner,' he explained. 'If you have good technique, it can be changed and adapted depending on the environment. If you can build that efficiency, utilising your elastic system, it will transfer to all disciplines of running.

'It frustrates me when people say that they are more suited to a hilly race and I wonder how that can be. Are you efficient? Are you able to translate your fitness into the race that you are running in? And yes, there may be some specific training that you can do – but if you are efficient and you are elastic then it should make absolutely no difference. The reason people find it hard to, for example, run uphill is because their technique changes – they crouch down and get tired and they lose all of their elasticity. Actually, running a road marathon and running a technical trail marathon should not

require a vastly different technique – if you are good at one then you should be able to be good at the other.'

Finding Tom, as a UK-based athlete who was able to truly adapt his movement in order to optimise the energy from his fascial system when running, was a huge moment in my journey. What I discovered, though, further reinforced my concerns about the negative nurture that many of us had been affected by. That's because Tom – like Nicky – had not really been exposed to it. He had always been active, always loved being outside – choosing walking his dogs over playing video games – and he went straight from school into the army. If how we run is directly linked to how we live – which I believe it is – then, just like the runners in Bekoji and Iten, Tom had never lost the ability to run like our species is intended to because he had not been exposed to anywhere near the number of bad habits that so many of us have been affected by.

'Being in the army has made me physically robust. Hiking around with a backpack for hours on end in the Brecon Beacons may not be good for your body but if your body is able to adapt and become strong by doing that then running becomes quite easy and quite natural. I think it has been hugely advantageous.'

His experience in the army had also taught him that if you make a body that is conditioned to perform, you can transfer that performance into any scenario, something we have seen him apply with success in a wide range of running disciplines.

Tom worked hard to ensure that he was mindful of his running form and that he was maximising the elasticity from his fascial system. He was a clear example of someone who had been able to take on board the ideas that I was coaching and turn them into clear and positive results. He was also fast becoming a formidable competitor, exemplified by his third-place finish at the iconic Western States 100-mile race in California, recording the fastest time ever for a non-American. He was someone who was truly becoming an elastic runner.

'It makes such a massive difference,' he told me. 'I'm so surprised that not everyone is doing it. For me, it's an absolute no-brainer. It works. Don't get me wrong, I'm certainly not the finished product. There are still things I need to work on. I know that I can still improve. I can go much faster.'

For me, that’s a hugely exciting prospect. For those lining up alongside Tom at future races, it’s a rather frightening one.

AMAZON JUNGLE, PERU

The Manú National Park lies deep within the Amazon rainforest, stretching from the Andes mountains all the way to the Madre de Dios River. It appears almost impenetrable – and it's easy to see why once you have endured the arduous journey to get there. After an 11-hour flight to Lima and a connecting flight to Cusco, we embarked on a seven-hour drive, travelling over narrow, precipitous roads in the high Andes and through small, remote villages before finally descending into the hot humidity of the Amazon basin. With the latter part of the journey being on board a minibus that had, somewhere along the way in its extremely long life, left its suspension by the side of a dusty excuse for a road, just getting there without injury was the first test.

It was easy to put that behind us as we arrived at Cloud Forest Camp. At 11,000 feet above sea level, we stared down the expansive valley right over the canopy of the jungle. Below us, clouds rolled through the luscious green canvas and we could see mile upon mile of palatial rainforest. If the altitude hadn't already taken our breath away, the view surely would have.

We were here for the Jungle Ultra, organised by race company Beyond the Ultimate – a 230km five-stage footrace through the rainforest. And as delightful as that rainforest looked from the vantage point that we first arrived at, with its incredible biodiversity and thriving, unspoilt veneer, the experience under the canopy was far from pretty.

To start with, in the jungle almost everything is trying to eat you. There's no salt and, as it turns out, anything that moves in the Amazon loves salt. The best thing to do, then, is to avoid sweating at all costs. Sadly, with temperatures of around 30°C and the most outrageous humidity I'd ever had the misfortune to experience, if you weren't sweating, you probably weren't living.

Once under the canopy, the cloud that looked so magical from above actually presented itself as a dense low-hanging fog. This provided moisture, making the atmosphere extremely humid and, when mixed with the copious amounts of soil underfoot, created a thick, oozing underlay of mud.

The BTU team did a great job of carving a route through the forest but it felt like a race against time to get through the meandering handmade tunnel before the forest's botanical grip closed the gap behind you, trapping you inside. Lose your hat along the way and you might just have had time to reach back and grab it before the asphyxiating green tentacles slammed the door shut.

The other obstacle was the endless number of rivers and tributaries that flowed across the route. There were more than 70 river crossings in the race, adding difficult and time-consuming physical and mental challenges to the already extreme terrain.

There was no way of dressing it up. As environments went, there weren't many that would make you sweat, itch, slip, slide and suffer as much as the Amazon. And that was before you'd factored in the exertion of five days of running while carrying all of your food and gear.

I was here as a researcher and as part of the race crew. What that meant in practice was that I was welcomed into the research centre at Cloud Forest Camp and treated like a bona fide expert in my chosen field. And that runners still threw their sweaty tops at me.

Having travelled extensively in Africa and worked with vast numbers of runners at home, I wanted to start researching athletes and indigenous people in extreme environments. This was my first 'extreme' project. The research centre was, at least for the Amazon, a comfortable and palatial building, which stood on stilts overlooking the valley below. It was a place for real researchers to base themselves and, as much as it was nice to be treated like one, I didn't feel that my own research came anywhere close to deserving it. Next to me was a man doing a PhD on the morphology of hummingbird beaks. He was basically studying hummingbirds and plants and trying to work out whether the plants were changing because of the birds' beaks or the beaks were adapting because of the changes in the plants. Despite this being one of the coolest research projects I'd ever come across, he seemed far more fascinated by what I was doing.

In hindsight, I bit off more than I could chew. First, I was putting movement sensors on runners – something that I have done on my travels ever since. These sensors allowed me to take laboratory-type technology into the natural environment so that it was no longer just my eye that was researching movement; there was clear supporting data to analyse in the field. I was also still videoing the runners – another technique that I had started to use both in my research and in my coaching – so that the athletes could see and visualise their movement and any changes that they were making as a result of our discussions. Added to this was the proverbial bridge too far. Or should I say, bridges. I was taking blood samples so that I could count white blood cells, saliva samples to measure proteins and conducting research into perceived rates of exertion. I was largely following the trails of the runners, sometimes by vehicle if possible, but mostly on foot and therefore carrying all of my gear. I had sensors, laptops, blood sample kits, a blood spinner (so that I could process the samples on site) and all my day-to-day stuff.

I soon understood that this was going to be a baptism of fire: I was dropped into the Amazon with all of this gear to carry, I was being eaten alive, it was 100 per cent humidity and I was taking blood from an athlete who was now, quite frankly, royally pissed off that they had agreed to be part of the research in the first place. The equipment, which seemed pretty easy to use when I was in cooler climes with the benefit of time and optimum conditions, soon became much more difficult to operate out in the field.

This additional research was not something that I would repeat. I realised pretty quickly that it was a distraction from the real purpose of my trip. A purpose that provided an interesting parallel to the hummingbird research being conducted by my new friend. What I was here to establish was whether we humans, who were well trained in running on home turf, were able to adapt to an unfamiliar environment as we moved through it or whether, ultimately, it was the environment that would have to yield to us.

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‘Fear doubt and uncertainty.’

Mark Denby was reflecting on his race in the Amazon.

‘A runner named Stuart Mills coached me for a while and that’s what he used to say. If you’re worried about it being too hot, he warned me, the worry itself will drain your energy tanks and increase your perception of effort long before the heat actually gets to you. How true this turned out to be.’

Mark arrived in the jungle with an enviable record both as a race walker, which is where he started, and as a long-distance runner. I first encountered him on the T184 – a 184-mile footrace that I used to organise, which followed the Thames Path from the Thames Barrier in London to the river’s source in Gloucestershire. During this race, Mark proved himself to be mentally strong and an excellent competitor both in terms of his running and the personal administration required when running long self-supported races. When I recced the course, I finished in 57 hours, and it nearly killed me. Mark finished in an impressive 41 hours, won the race, set the course record and still seemed pretty disappointed with himself.

To prepare for Peru, Mark had not only spent time heat training in Corsica and Malaysia but had arrived in Cusco two weeks early in order to acclimatise to the altitude.

‘The problem,’ he explained, ‘was that it still knocked me senseless. I could barely get back to the apartment from the supermarket, let alone go for a run.

‘I was suddenly dropped into an alien environment. Everyone was speaking another language, the food was different, the humidity was high and the altitude had far more of an effect on me than I imagined it would. It was daunting. It was exhausting. I spent the entire two weeks just getting used to being in Peru. Then we moved to the extreme of life in the jungle.’

Once we’d arrived at camp for the first day of the race, Mark – just like the other competitors – had to get used to a whole new level of discomfort.

‘The plants, the trees, just everything was different. It was a complete unknown. The ground was slippery and we kept falling over. Just the experience of learning what to touch and what not to touch was draining. There were snakes. Spiders. Things that prickled. Spikes that came off plants and embedded themselves in your legs. Fire ants that crawled into your ears. It was like no other place I’d ever been on earth and there was nowhere that you could go to get a break from it.’

On the start line, the differing personalities of the participants showed through in their pre-race routines. Some fidgeted on the spot nervously. Some chatted and made light banter. Some stood still and focused. Others worked themselves up into a frenzy, ready to dive in with both feet and take on the mammoth challenge ahead.

As soon as they started running, my work began. And, as it turned out, my research was far more analogous to the hummingbird study than I'd imagined it could be. It became very clear very quickly that the jungle environment would not bend to the will of the runners. It was those who adapted best to the environment who ultimately prevailed.

The first ones to fall were those who attacked the race head on. The ones who arrived all pumped up and ready to take on the challenge, like caged fighters being released on their next opponents. Many had trained for years. They had brought all of the right gear with them. They were prepared to push themselves to the limit. These guys and girls approached the race like it was them versus the jungle and most of them effectively burned themselves out before the first day was over – the jungle simply chewing them up and spitting them out.

While the tension (from a tall, elegant posture) that engaged our elastic system was vital for efficient movement, I was beginning to realise that tension in our mind was a runner's true nemesis. We must not confuse the two.

Our posture is an extension of our emotions. The more fluidly we can move, the better. If we are tense in our emotions, feeling adversarial, then we are tense in our movement. The difference between a good athlete and a great athlete is the ability not to be tense. To remain calm under pressure. To channel potentially disruptive emotions so that they do not impact negatively on performance. One of the traits I have noticed in all of the great African runners I have worked with is that they are incredibly relaxed – when running and in life generally – even though they are determined to win.

Those who accepted the jungle – and moved with it – got on far better and moved with far more fluidity than those who tried to fight it. They adapted and this manifested itself in some fascinating ways.

First, these runners almost exclusively set off with a high cadence. For most of them, this was not their usual running cadence and it was a decision

born entirely from their unconscious mind. They were all nervous. Under pressure. When we encounter something new, our brains crave information. The foot is the only part of us that is regularly making contact with the ground and is therefore our body's key source of information about the terrain we are running on. So, in order to get that information as quickly as possible, the athletes subconsciously increased their cadence to ensure more regular contact with the ground.

Arms also became a key area of focus. One of the most common issues I see with running form is that people do not use their arms correctly. In fact, most people only seem to bring their arms with them on a run because they can't leave them at home. What that results in is a huge variety of idiosyncratic behaviour. I've seen it all – arms held high like chicken wings, arms crossing the body, arms waving around, detached from anything else that's going on – and every iteration in between. What I started to see almost immediately in the jungle was that people who were not moving well on normal terrain, where they would switch to autopilot and their arms would revert to their usual random positioning, started to use their arms to aid their movement in a far more natural and intuitive way. Using them to propel themselves forwards. Using them to create balance. These runners were adjusting, building fitness to perform and almost getting in touch with something primal – a deeper connection with their surroundings and the way they moved through them – just because they were in an alien environment.

All of this, however, came at a cost. Those not used to running at a high cadence found that they were simply not conditioned to do so and it became hugely challenging for them to maintain this better running form for the entirety of the race. Those who used their arms well found themselves reverting to their default movement as soon as the terrain eased a little.

There was also a calorific cost to all of this that was best exemplified by Mark Denby.

Mark was a planner. For the T184 he had been meticulous in balancing the weight of his gear – to ensure that he was not carrying a gram more than necessary – against the need to consume enough calories to fuel his race. He took a similar approach to the Jungle Ultra but with one important difference. He had not considered – nor was he able to consider without the

benefit of hindsight – how much mental pressure he would be under in the jungle.

The brain is a huge gas-guzzling co-ordinator. For a multi-day race, where you're carrying everything you need for those days – including all of your food, sleeping equipment and clothing – most people's perception is that they should carry as little as possible. People even cut labels out of clothing just to reduce the weight of their pack. In terms of calories, then, the common approach is to bring as little as they think they can get away with.

'We had to carry a minimum of a thousand calories a day,' he explained to me. 'I cranked it up to 1200 because the weight difference wasn't that much. However, on the first day of the race, I decided that my pack was too heavy. I seriously considered eating all of the extra calories that I'd brought in order to reduce the weight. I'm very glad that I didn't because, in the end, what I had wasn't enough.'

If this had been a race in the UK, where Mark was on familiar ground, his original calculations may well have stood up. What he hadn't factored in was that his mind was working overtime. River crossings, navigation, dealing with mud and insects and the threat of snakes and jaguars. His brain was writing cheques that his body simply couldn't cash. As a result, Mark was starving almost from the get-go.

'There were three of us jostling for position. I found I could keep up with the other guys for the first few hours of each day. In fact, I could lead without too much effort. Then I would drop back and I couldn't keep up long term. I realise now that this loss of energy was down to nutrition.

'One day in particular stood out. The organisers had to delay the start of the race due to bad weather. By the time they told us, I had already eaten my allotted 300 calories for breakfast. As I sat there waiting, I could literally feel the energy from the food draining from my body. By the time we kicked off, I'd already burned through it. I was completely flat.'

This greatly affected Mark's movement. At this point we hadn't worked together on improving his running form but I watched his posture change dramatically. He wasn't moving as elegantly – or, crucially, as efficiently – as he would normally have done and his race performance was severely affected.

Mark still ran a good race, finishing third overall. However, by his own standards, he was disappointed.

What I had seen in the Amazon was evidence that, albeit temporarily, we seemed able to adapt quickly and subconsciously to a far more natural running style when forced into an unfamiliar environment. This was exciting but it also seemed to come at an energy cost caused by mental exertion. What I was starting to understand, then, was that one of the biggest obstacles to changing our movement was not just our physiology. It was also our minds.

UNIVERSITY OF KENT, ENGLAND

Our brain lives in a dark and silent place. Encased in our skull, it works on proprioception (our awareness of the position and movement of our body) and electrical impulses to make best-guess scenarios from the information available to it. The more often we make a movement that's similar, the better the best-guess scenarios our brain can make because it recognises that information.

That has to be one of the biggest challenges when it comes to changing our movement: if we start to make new movements with new signals, the brain is not used to making best-guess scenarios from that new information. Instead, we are immediately challenging the sea of tension in our body and throwing our brain a whole load of data that it's never seen before and is not going to make very good guess scenarios from.

Extrapolate that to an extreme environment – with different temperatures and new, challenging terrain – and it was very clear to see what challenges we faced through observing our movement. Most people didn't have the opportunity to train in these extremes and, when they travelled to a race, they were immediately dropped into a novel and strange context, worlds away from those experienced during the majority – if not all – of their training. As they initially reacted to unfamiliar surroundings, they adopted movements that they were not used to making in training and so – while in many cases they were more natural and more efficient – they paradoxically struggled to maintain them. The corresponding energy cost was enough, in some cases, to end their chances of enjoying the experience and in others, to end their hopes of even finishing the race.

Back at home, I was noticing the same thing in my coaching. I would work with runners who would fatigue very quickly when adopting the 'elastic running' techniques that I was now coaching. They would return

from a 400m lap around the track, bent over double trying to catch their breath with a much-increased heart rate. They were hitting an invisible barrier and immediately reverting to their old default running style in order to recover. I was concerned about this. I was supposed to be making people more efficient in their movement, not making them feel like running was more effortful.

The concerns that I'd had as a result of my trip to Uganda were about our changes in physical habits. Now, I was also seeing very clearly that these concerns extended to our ability to deal with the mental challenges that occurred when we tried to change the way we moved. I realised that I wasn't just dealing with the hardware when I was coaching new techniques. It had to be about the software, too.

Thankfully, one of my research partners was the University of Kent and one of their professors – the one I had worked with on the various blood samples and saliva tests that I was taking in the Amazon – just so happened to also be a leading light on brain training for endurance performance. In search of answers, I therefore found myself back at the university and once again knocking on the office door of Professor Samuele Marcora.

A passionate and talkative Italian, Sam was a man who wasn't afraid of an academic duel. Spending time listening to him talk about his research was like riding a rodeo bull. He moved through topics at lightning speed, there was a fair amount of swearing and you just had to cling on for dear life and try to stay with him. Having said that, he was always a pleasure to be around. Always frank in his views. Never one to mince his words. At our first meeting, he delightfully described my research – which, admittedly was in its early stages – as 'potentially bullshit'. I have always appreciated his candour!

I laid out my concerns to him.

'Let's go back to Lieberman,' he answered. 'As we evolved, we became efficient at walking and running in order to find food. That's how we survived. I would argue that we also evolved to be lazy. Not lazy in the "I can't be bothered" sense. It was about avoiding doing physical activity that wasn't worth the effort. Avoiding unnecessary exertion. We developed an ability to conduct a cost–benefit analysis so that, even with our economical running style compared to, say, a chimpanzee, we didn't run around all day for no reason burning calories. We didn't see an antelope 5km away and

just start running after it. It was simply not worth the effort and would lead to a negative calorie outcome. We developed a perception of effort in order to avoid expending energy for no reason.

‘When you tell people to modify their running, the reason they find it hard is because they are trying to exert conscious control over something that is otherwise automatic. Concentrating on something so intensely increases our perception of effort.

‘If you hadn’t told me how your athletes were reacting,’ he continued, ‘and you said “Sam, what do you think would happen if these runners concentrated hard on their technique?”, I would have said that their perception of effort would go up significantly. I could have told you that based on the science.’

I could see the issue my runners were facing. The brain craves efficiency. One of the reasons we have been very successful as a species is that we are good at adapting. So we now live in this world where we don’t move very well because we don’t have to and we have actually become quite good at that. The majority of us are moving around in a way that is not efficient and yet we have become incredibly efficient at it.

We are programmed to find an easy way and stick with it. The moment you start to get someone moving in a more efficient manner, it is a problem – not because of energy expenditure, which is actually improved and, according to Sam, is largely irrelevant to our perception, but because the conscious mind has to engage in the process while, at the same time, being challenged by the subconscious mind, which is saying ‘No, you go back to heel striking with your head down because we like that and we are good at it’. It is this process that causes fatigue.

‘I can give you an example,’ Sam said in his strong Italian accent.

‘I tested a group of athletes riding on static bikes. For some of the athletes, I showed them the names of colours on a screen – green, red, blue etc – and asked them to identify them. However, I asked them to only select the colour of the word, not the word itself. So if the word “red” appeared written in blue, they should select blue.

‘The problem,’ he told me, ‘is that when you read the word red in blue, your automatic response is to press red. You have to exert cognitive control to stop that happening. As a result, the riders doing this task fatigued far more quickly than those who were just cycling.

‘That’s exactly what you are doing when you ask athletes to concentrate on their movement. Because some of these processes are mentally demanding, especially when they are trying to modify something that is otherwise automatic – it feels effortful. That’s on top of the effort that they already putting in when they are running.

‘That’s where science can also help you,’ Sam continued. ‘Because it’s expected that it will be hard if we are consciously engaging with our movement. But we also know that it gets easier. We find strategies. It becomes automatic and we are not required to exert as much conscious control. In the cycling test, for example, after a while the riders found ways to cope – like squinting to only see the colours – and it became less effortful.

‘It’s a learning process. In a way it’s like teaching someone a new skill, such as playing tennis, only in your case, you are actually dealing with people who need to also fight against years of experience of running a different way.’

What I was coming to understand was that the more we made new movements, the more they would become automatic. If that movement was more efficient than the last one we were making, not only would our perception of effort reduce over time but so would our energy expenditure. We just had to ride out the inevitable initial challenges that came with an increased perception of effort as we processed those new movements.

I actually found that exciting. It’s true, most of us can run and simplicity is therefore both running’s beauty and its nemesis. However, what I was trying to do was unlock the secrets to how we would have run 10,000 years ago when we were hunter-gatherers. I wanted people to move in a way that accentuated the gifts that Mother Nature had provided, creating Darwinian fitness (i.e. fitness to perform the task) rather than just cardiovascular fitness. And I was now convinced that the key was as much in our software as it was in our hardware. Getting the runner to understand that and the challenges that were going to come – including an initial feeling of increased effort – would make it a lot easier for them to get their heads around it when it happened. To realise that their perception of effort would increase because they were challenging their default and in the process engaging their conscious mind – something that would ultimately get easier as their default adjusted to the new movement.

I left Sam convinced that if we could mentally challenge ourselves to change our movement – and if we could persevere through the initially difficult adjustment that this process would bring – then training our software might just be the key to the physical hardware changes that we needed to make.

On this journey, I was finding that we often learn by extremes. Having spent so much time in the sticky heat of the jungle, I decided that, for my next trip, I would go straight from the frying pan and into the freezer.

ARCTIC CIRCLE, SWEDEN

I heard my leg snap twice as we crashed to the ground. I spat out a mouthful of bile and lay still, assessing the damage, lonely in the company of a new-found pain. I imagined my twisted wreck of a limb mangled at the bottom of the oppressive cold pile under which I was now entombed. I was shivering. Whether that was the shock or the temperature, I wasn't sure. What I did know was that I couldn't stay here much longer. I wrestled my hands free and started to dig.

Moments earlier we'd been cruising along, trying to make up ground on the incredibly fast-moving Robbie Britton. As an experienced and decorated ultra runner (Robbie won bronze at the 24 Hour World Championships in 2015), we knew he'd be hard for the other competitors to beat but we didn't think we'd be struggling to keep up with him on the snow bike. He was miles in front of the other runners and we needed to get to the finish line so that we could set up and ensure a vital warm welcome awaited him at the end of day one. With temperatures dropping to -40°C, waiting around in the cold would be no joke. I had also strapped movement sensors on to Robbie so that I could analyse his running dynamics data during the race and was keen to keep him in my sights.

The bike constantly shifted and glided on the snow as we powered forwards. That was until the ground beneath it started to give way completely and we experienced a lot less gliding and a lot more shifting. I accelerated, hoping to ride out the slide, but we kept on falling until deep snow, a fully laden snow bike and Brett Rocos, the race paramedic, all lay on top of me.

Thankfully, help arrived in the form of race director Kris King, and he assisted in our efforts to dig ourselves out of the snow. When the bike was finally lifted off, I was rejuvenated by just seeing that my foot was pointing

in the right direction. Standing was the next challenge and my attempts were greeted with a sharp pain. I couldn't put any weight on my leg but there was no benefit in hanging around, with all of us cold and the need to move now desperately urgent. In any event, I had a job to do. I said nothing about the snapping sound I had heard, jumped back on the snow bike and we pushed on to the finish line.

We were in the Arctic Circle for the Ice Ultra, a 230km five-day footrace across the frozen plains of a UNESCO world heritage area of Swedish Lapland. Officially Europe's last designated wilderness, it was at the other end of the extreme spectrum to the Amazon. There were no bugs or critters here. We didn't have to worry about an abundance of exotic plant life either. Nothing much survived the brutal sub-zero temperatures. The landscape was a beautiful rolling snowscape, even if pausing for just a moment to take in the view involved dicing with hypothermia.

This was my first year here and I was now in survival mode, taking painkillers and trying to convince myself that the leg – which I feared might be broken from the crash – was not that bad. That didn't detract from the important discoveries I made, though. And, ironically, the biggest of them all involved something I'd just experienced on a brutal scale: impact.

The average person does not move well on ice and snow. Unless you live in a country that has an abundance of it, you are unlikely to do a great deal of specific training.

As soon as the race started, you could tell that most of the competitors were not used to the terrain. Apart from Robbie, who bolted into the distance, most of the runners started tentatively, as if dipping a toe in, rather than fully committing to the race environment.

As I saw in the Amazon, their average cadence went up. There were probably two reasons for this. First, the brain, which wants that data from the foot, almost forced the racers to hit the ground more regularly in order to work out how best to tackle the unfamiliar terrain and, second, when we land on a surface such as ice, where there is a high risk of slipping and falling, we automatically tread more lightly and with more regularity. Self-preservation takes control.

Traditionally, many running coaches have told their clients to run as if they are on thin ice. This is because they want to minimise impact. The force with which we hit the ground as we land is one of the factors that

causes us to tire and muscles to degenerate and is the root cause of injury. The theory goes that if we reduce impact, we will reduce that force and be able to run for longer, with fewer injuries.

If we viewed our skeleton as a supporting structure from which everything else was attached, then preserving that structure from impact made total sense. But the more I viewed the body as an elastic system in which our bones floated in a sea of tension, from which we could create elastic energy, the more I started to think that the much vilified ‘impact’ was perhaps not the enemy at all.

What I noticed in the Arctic was that, whether it was on snow (a surface that gives very little back when you land on it) or ice (where we increase cadence to avoid slipping), treading lightly with minimum impact equated to one outcome: a complete loss of dynamic movement.

Elastic energy is what propels us forwards. I remembered James Earls’ description – our weight goes down, lengthens the spring, captures the energy and uses it to bring the weight back up. If you push a spring with minimum force, you will get minimum return. Those competitors on the Ice Ultra who were producing less impact than normal because they were moving so close to the ground at all times were, at best, walking and, at worst, shuffling. Reducing impact changed their propulsion, reduced the amount of height they were able to get into each stride and, basically, sucked them to the ground. It was actually just an exaggerated version of the action of many of the runners I was seeing at home who were afraid of impact.

I was starting to think that we shouldn’t be so scared of hitting the ground. Of course, it wasn’t about stamping hard and hoping to create more force for the sake of it – there was a lot of logic in believing that we should not create unnecessary impact because it puts more strain on our bodies – but I wasn’t sure that we should be apologising for hitting the ground either.

My research on thousands of athletes has shown that when we run fast we inevitably create more impact. But the question in my mind was whether we were creating more impact because we were running fast or were actually running fast because we were creating more impact.

I returned home with a lot to consider. Before that, though, I went straight to the nearest hospital. My fears were confirmed. The impact of that snow bike accident had indeed broken my leg. I was told to avoid putting any

weight on it, to rest and not to do anything at all strenuous. Not even to drive my car. I decided not to mention that I’d just spent eight days riding a snow bike, wading through deep snow and working full pelt as part of the race crew on an epic adventure in Arctic Sweden.

SAHARA DESERT, MOROCCO

The Marathon des Sables is a six-day, 251km ultramarathon – so often (whether rightly or wrongly) described as the toughest footrace on earth. It was the first multi-day stage race that I completed and I have since coached, prepared and analysed countless runners who have gone on to compete in the Sahara.

It was also a race that, as far as the men's podium was concerned, had been widely dominated by Moroccans. In fact, save for one year when a man from Jordan took first place, a Moroccan man had won the race every year since 1997.

Living deep in the Atlas Mountains, the ancient Amazigh (known more commonly, despite their dislike for the term, as the Berbers) practise a way of life that can be traced as far back as 10,000 BC to the indigenous people of North and North-West Africa. The Amazigh exist in an arid and, by many people's standards, largely inhospitable environment. They are always moving – often over long distances and mostly on foot. As a result, they grow up running to school or to market; they tend to their animals and they live a nomadic lifestyle that closely resembles that of their ancestors. It requires a physical toughness that is ingrained in them as people. Perhaps not surprisingly, then, many great runners have come from the Amazigh and, just like I saw in Bekoji and Iten, their movement appears to be as deeply rooted in time as their traditional way of life.

Two such runners were the Ahansal brothers – Mohamad and Lahcen. Between them, alongside an array of other running achievements, they had won the MdS 15 times. For this particular trip, I was extremely fortunate to be invited to attend one of Mohamad Ahansal's training camps and to be given a front row seat to watch Mohamad work with some of the best

Moroccan runners, as well as some very talented athletes from around the world.

It was a true privilege to stay with the camp and witness Mohamad's coaching. I spent a lot of time watching him move, watching him teach, discussing movement with him and understanding his thought processes for moving over sand. That helped me to develop my knowledge in terms of movement generally as well as movement specifically in the desert. However, from all of the excellent runners, who included Pavel Paloncy (whom we will meet later) and Moroccan Abdelaziz Baghazza, it was the movement of one of the young female athletes that really caught my attention. Her name was Aziza Raji.

Aziza was not just a quick runner but she was also fast becoming a role model to many young Moroccan women. As a Muslim woman in a traditional rural community, taking part in sport was, at best, frowned upon and, at worst, prevented. Most young women were married by the time they were in their early 20s and were expected to take responsibility for keeping the home. Aziza grew up watching her brothers run and decided to try it for herself in her early teens. She was a natural. Her successes since then had included finishing as first female at the Oman Desert Marathon in 2016 and again at the 2016 edition of Mohamad and Lahcen's own Trans Atlas Marathon. She had twice finished in the top six at the MdS and was second at the 270km Meraas Al Marmoom Ultramarathon in Dubai. She had a bright future and was blazing a trail for other young Moroccan women to follow.

There are so many things that influence our movement, including how we live, how we feel, how we perceive our movement and whether we actually engage in movement as a skill or simply move in a passive, unconscious way. By travelling so extensively and analysing runners from all over the world, I have been able to build a picture of the factors that I believe lead to the most efficient and effective ways to run, and it all links back to the way that I believe our species is designed to move. That's not to say that there aren't variations and traits that are specific to certain people or regions – that's why I continue to travel and continue to learn – but in general terms, where I was seeing good movement, I was seeing common patterns. Analysing someone whose lifestyle was so deeply rooted in time gave me a deep insight into the natural movement of people in this area. A movement

that was not affected by modern life in the way that I was seeing back home. What I learned from watching Aziza run helped to further develop the conclusions that I had reached in the Arctic.

Out of all possible terrains, sand is the ultimate hoover. It will suck you to the ground with every step. Never has the phrase ‘one step forward, two steps back’ felt so literal as when you are trying with all of your might to run up a sand dune. If you fight it, you will surely lose. There is so much give in sand that, with every foot landing, we sink. As a result, the force we are able to create when we strike the ground is dampened. We cannot help but leave a footprint, which we would find very hard to do on asphalt. That’s because the thousands of grains of sand that we touch with every footfall are displaced, dissipating our impact in a way that hampers our ability to harvest energy from our landing in order to rebound. With all of that energy lost out of our system, it needs to be regained from inside our body. If we are not careful, we end up relying on our muscles to push us out of the sand. In doing that, there’s a good chance that we are not utilising our elastic system but instead trying to create an explosive power that we don’t have the physiology to be able to maintain for long periods. We therefore tire extremely quickly and what we end up doing is effectively walking – or wading – through sand.

What Aziza exemplified was an extremely tall dynamic gait with a huge stride length and lots of height in every step. This meant that by the time her leg came back towards its landing it was already underneath her, allowing her to spend minimal time on the ground so that the sand had less chance to steal her momentum. Keeping her time on the ground (measured as ground contact time) to a minimum was therefore vital.

What was fascinating was that none of this impacted on her natural cadence – which was still perfectly where I wanted it to be – nor did it seem to tire her out. She had a body capable of executing such a dynamic movement, her arms flowing in an exaggerated fashion, almost scooping behind her and reflecting the fact that her legs – which mirrored the movement of her arms perfectly – needed to almost be scooped out of the sand. She was fit for purpose and fully conditioned to running on sand. Not only that but the movements she was making starkly reflected those of the runners I’d analysed in East Africa. She appeared to be making full use of her elastic system.

I didn’t see why this movement should be limited to sand. I was now convinced that increasing our vertical oscillation (which is the measurement of the amount of height – or ‘bounce’ or ‘air’ – we get in our stride) – was crucial to our elastic movement. If we did this, we gave ourselves time to cycle our legs comfortably beneath us, reducing ground contact time and allowing us to increase our cadence and load our body efficiently.

One of the concerns that I had was whether, from what I had seen in so many runners at home, we actually still had the ability to create the bounce in our stride that I was now hoping to see. While I accepted that it would always be relative to us as individuals, it seemed like our ability to create the sort of dynamic movement exemplified by Aziza was a key trait in the lost art that I was rediscovering. My big worry was that it may now have been lost for too long.

On my journey to the Sahara, I’d heard a rumour about some individuals whose movement almost defied our beliefs of what humans were capable of. It sounded like they were right here in Morocco. I had to find them.

ESSAOUIRA, MOROCCO

The marketplace was a riot of spice and colour. The stalls in the labyrinth-like streets peddling their wares created a busy and bustling backdrop: clothes, tapestries, souvenirs, food and spices piled into pyramids were traded and bartered over. The sights, smells and sounds were a veritable treat for the senses. Of course, I was too distracted to notice any of it.

I pointed my camera skywards, hoping to capture at least some of the awe-inspiring aerial display as they bounced dynamically overhead, flipping and somersaulting in mid-air. There was no trampoline or man-made elastic of any kind involved. Every action, every reaction, was the result of the pure power and natural elasticity created by their bodies. These were not elite athletes or highly trained dancers. They were not fitness freaks with subnormal physiques. They were street performers from Algiers who had simply rocked up in the bustling port of Essaouira to wow the passing crowds with their high-flying routine.

We have the ability to be incredibly elastic. If you ever need proof, track these guys down. I had seen elasticity in many people on my travels but this was quite simply another level. When we run, we push off from the ground each time we stride forwards. This creates bounce (or height) in our stride. As we saw in the Arctic, bounce is often demonised by runners because of the corresponding impact. Create too much bounce as you rebound, says the rule book, and you are wasting energy in gaining height that could otherwise be used to propel you forwards, and creating impact that could harm you when you land. Many running coaches therefore see high levels of vertical oscillation as a bad thing.

The way I see it, we are doubly compromised. Many of us live a life that lacks dynamic movement and we are also running from a rule book that encourages us to be less dynamic when we run in order to protect us. Is it

any wonder, then, that so many of us are being sucked to the ground when we run?

From the data that I have analysed in working with thousands of runners, I believe that by trying to minimise bounce so as to save against impact we are in fact making next to no difference to the impact we create but are instead dissipating it very poorly, thus leading to a jarring running style that lacks dynamism and actually increases our risk of injury. Our fear of impact is making our running form unnatural and less efficient.

If you consider our movement in the context of Newton's third law – that for every action, there is an equal and opposite reaction – then we should realise the importance of impact. It is not our enemy. The key is to learn how to use it to our advantage. I believe that it can become a massive attribute.

We must become students of our movement. The acrobats at the Cirque du Soleil move their bodies with grace and flexibility. Men and women who specialise in Parkour leap and bound around an urban environment, creating significant elasticity and bounce that defies what we would otherwise consider to be humanly possible. Olympic divers spend hours working on the minutiae of their movements in order to reach the optimum level that stands them above the rest. Watch someone who plays cricket, tennis, swims or dances – they will all display movements that join in with their natural lines of elasticity. All require training in movement in order to perform the required actions efficiently and effectively. In fact, runners are pretty much the only athletes who – as a general rule – don't actually bother thinking about how they are moving or about putting their body into a position that optimises performance. Yet running is something that more of us do than any other sport on the planet. How can that be?

I think it's because we don't think of running as a movement skill. We see it as a try hard skill. It's an innate ability. All humans can do it. So we do it. We lace up our trainers, walk out of the front door and start into the actions of us running. We don't have any real perception of how we are moving or whether it might be the most efficient or effective way. We just presume that if we work hard and put maximum effort in, then we will move forwards as well as we physically can. If we want to improve, we run further or harder. The rest is on autopilot. Running beautifully doesn't really enter the equation.

The street performers I was in Essaouira to watch were not from a long line of acrobats. They were just young men who loved to perform. Even when I got them running, they could get several feet up into the air as they were striding forwards. It was an exaggerated movement but the timing was there, the relaxation was there and the balance was there.

To put it into some perspective, many of the people who come to me for advice are struggling to create 8cm of vertical oscillation. These guys could get up to 8 feet.

If that makes you feel bad, it shouldn't. It should really excite you.

There was no special training regime behind their performance. They didn't wake up at 5 a.m. every day and go to the gym for a few hours of gruelling plyometrics. What these acrobats could do was extraordinary but they could move like this quite simply because they did it a lot and they had become good at it.

I was starting to realise something: the best way to create a body that moves beautifully is to move beautifully over and over again. Every mile that we run is an opportunity to practise good running movement. If we don't then when it comes to the crunch – as I saw with many of the runners I analysed in the Arctic and the Amazon – we will not be conditioned to perform these movements when it matters.

CHAMONIX, FRANCE

It was 7.15 a.m. on the cold, foggy morning of 2 September 2018. As he descended from the mountain pass, Grand Col Ferret, the highest point of the Ultra-Trail du Mont-Blanc (UTMB) course, he moved into seventh place. He was around 13 hours and 100km into the 170km race, a little cold and physically and mentally deteriorating. After placing 12th the year before, he had daydreamed for as many months about being in the top 10. This was his fourth consecutive year at the UTMB and the best position he had ever been in. There was still a long way to go but his plan was finally starting to come together.

Damian Hall is a self-confessed underdog. Hailing from the lowlands of Bath in England, he has – against the odds – become a successful trail and mountain runner. While previously active in the outdoors, Damian didn't run much at all until his mid-30s; he spent a considerable amount of time sitting at a desk due to his job as a journalist; and he had a young family. As far as developing and training as a competitive ultra runner was concerned, time was not on his side. In my search for living proof that we could change our movement in order to run as our species was intended, he was therefore also an ideal guinea pig. So, when he turned up at one of my ultra skills workshops as part of a magazine assignment and told me his back story, all that remained was for me to convince him that I could make a difference.

'It was early 2012,' Damian recalled. 'I had only run one ultramarathon at the time, but I knew that the madcap sport of ultra running was for me. I was in love with it, although pretty clueless about how to train, race or even run. I remember we spent the morning indoors, talking kit, nutrition, how to train for ultras and so on. And in the afternoon we headed to the hills for some technique work. I wasn't so excited about this bit. I knew how to run. Or at least I assumed I ran well enough as my body had, so far, always got

me to the finish line uninjured. Running technique didn't seem that sexy, compared to kit, all these big races and training runs being discussed among other runners.'

As I did at most of my sessions, I got everyone moving up and down so that I could video them. When we watched the footage back, Damian's form was a hospital visit waiting to happen.

'I've since seen a photo from that run and it's horrifying,' he admitted. 'I was overstriding, heel striking, lazy arms, head rolling forwards, slow cadence. In fact, I don't think I could have got running more wrong.'

I explained some of the basics of natural and efficient running techniques to the group and we finished the session with Damian excitedly talking to me about working together in the future. I knew then that he was hooked. What I didn't realise at the time was just how important our work together would be.

You see, ever since that first seminar with James Earls, I had been developing a theory. A theory that was later corroborated by my analysis of those street performers in Essaouira. I had started to wonder how many extra miles we were running a week or a month to create this mega-efficient engine that was actually compensating for, and working harder because of, our inefficient movement. I believed that if we moved more efficiently, we would need less oxygen; we would need to do fewer miles; we would have more time to recover; we would have fewer injuries. I believed that, overall, we would perform better and our super-tuned engine could be used to take us even further or to go even faster.

In terms of training, I wanted to prove that, as long as we focused on moving well, less could be more.

Luckily for me, Damian's second child had just been born and finding time to train was suddenly even more of a challenge for him. He was therefore well up for a little experiment.

We got to work.

'The new technique felt weird at first,' he remembered. 'I got the sense that I was going slower because I was taking quicker steps but, when I compared my new technique across a 1km distance, I was actually moving faster than before and with less effort. I entered a local 10km road race and won. From then on, I started to concentrate purely on form with the faith that this might actually work. I had loads more energy when I did run

because overall I was running less and, when I got the technique right, it felt like I was floating.'

Never afraid of throwing himself into the deep end, Damian took his new-found confidence to the next level and entered the Lakeland 50 – a stunning but brutal 50-mile ultramarathon around what Damian described as the 'lumpy' English Lake District. What's more, for the sake of another magazine article commissioned off the back of our work together, he agreed to another extreme: he would only train for three hours a week and, during those sessions, would focus solely on his running technique.

It was a brave move but the results were truly exciting.

'When it came to race day, I obviously couldn't resist trying to be competitive and went out a lot harder than I should have. However, once I'd relaxed into a more sustainable pace and just thought about moving with good form, I found a natural rhythm. That year was a trial race for the Great Britain trail running team so the field was about as competitive as it gets in the UK. However, I actually ended up placing 18th out of 600 runners and much higher than my meagre training volume suggested was possible. And it wasn't even a case that I had to death march my way to the finish. In fact, in someone else's post-race blog, it was pointed out that I had the fourth fastest split for the race's final section. I was shocked – and actually a little bit annoyed – that I had so much energy at the finish! Despite my lack of typical endurance training, I wasn't as fatigued as I normally would have been and my legs didn't feel anywhere near as trashed as they usually did the next day.'

This was a big moment for both of us: me, because it added much weight to my theory that concentrating on running beautifully was actually more effective than running for running's sake; and Damian, because it showed him what he was capable of achieving with efficient movement, even on a limited training plan. We resolved that we would continue the experiment but with Damian adding some more volume – within reason – to his training plan. It certainly didn't harm our progress when, soon after finishing the Lakeland 50, he became more than a little obsessed with arguably the biggest trail race in the world.

'UTMB in 2015. It blew my mind. One hundred and five miles starting in France and nipping into Italy and Switzerland on a circuit through the Alps. The race's 10,000m of ascent was more than climbing Everest from sea

level. Everything was so much bigger than anything I'd ever experienced before: the crowds, the course profile, the level of competition. All of the world's top mountain ultra runners were there. It was the big one. Quite simply the Super Bowl of ultra running. I remember going to watch the podium presentations on the Sunday afternoon in a sun-blessed Chamonix. When the top 10 men got up on to the stage, I gazed at them in awe. They were gods. Superhuman. I wanted to be there, on that stage. The race had got under my skin.'

Damian and I continued to focus on running as a skill rather than a try hard slog to the finish. He continued to balance his work and family with his training and building his racing know-how. He also continued to apply the theory that focusing on technique at all times was far more beneficial than focusing on mileage. The old ultra runner obsession with 100-miles-plus training weeks went out of the window.

'I did UTMB again in 2016. I improved to 19th place and then in the following year was 12th in a line-up considered to be one of the best fields ever assembled for a trail marathon. I should have been happy with that but, at one point in the latter stages of the race, I had been in 10th place. It was frustrating. I wanted one more shot at the top 10.'

This brought us back to the 2018 race, at which Damian found himself in seventh place with 70km to go.

'By rights, I shouldn't have been in that position,' he told me. 'My ITRA (International Trail Running Association) ranking for the race was 50th. I was up against younger, faster, child-free, full-time runners. I had to get everything right and gain every small advantage if I was to have any hope. I needed to stay on the basics. To me, that meant remaining tall, with a slight bend at the knee, small fast strides, keeping those lazy arms of mine swinging, thinking of myself as an elastic runner. Despite my fatigue and increasingly muddled mind, I kept thinking about my technique as I went up and down those last few mountains.'

Damian finished in fifth place. At the time, it was the best result by a British male at the UTMB for almost a decade. In a moment of beautiful symmetry, it was then my turn to stand looking up in awe at a stage on a sunny Sunday afternoon in Chamonix. It was the same stage that Damian had once dreamed of gracing. The same stage that he now stood upon,

alongside the nine other runners who made up the UTMB top 10. It turns out that they weren't superhuman after all.

I firmly believe that 5 beautifully run miles are better than 10 inefficient ones. If we are not moving well, then we are beating up our body every time we train. In doing that, while we might still be creating a strong cardiovascular system, we are not loading our body well and, as a result, we are getting to the start of a race having just spent months punishing our body via our training plan. Don't get me wrong, there are many runners who don't move particularly efficiently but have had great success because of a strong engine. It is essential in our sport. What I would always say to those runners, though, is this: imagine how much better you could be with more efficient and effective movement to go with that incredible engine!

Damian was another example of someone on home soil who had been able to change their movement in order to be more dynamic and join in with their natural elasticity. It was, however, something most of us appeared to have lost the ability to do. Fuelled by our success, I was now more determined than ever that, if I could, I would start to turn that around, one runner at a time.

REGENT’S PARK, LONDON

It was a traditional blustery autumn day. The kind of day that made me wish that I could put my principles to one side and work with athletes indoors on a treadmill.

OK, not really. I don’t even think that when the rain’s horizontal. It’s not fair on the athlete.

We were standing beside the running track next to London Zoo, a location that was decided upon during a typically brisk email exchange with James Earls in which I’d asked him if we could meet to discuss some recent findings on fascia and he’d asked me if I would teach him to run.

In one way or another, I am asked that question a lot. Normally, it arises as a result of something that’s happened to the individual, such as an injury or a desire to get a bit faster. Normally, it’s not quite as broad a question. Most people think they already know how to run and that they just perhaps need to make the odd alteration. In this case, though, it wasn’t just the scope of the request that took me aback. It was the source. This was James Earls. The man who had introduced me to fascia. I felt like I’d been asked to teach Lionel Messi how to do keepy-ups.

James and I had got to know each other better after the talk that I’d attended in North London. We’d started to exchange ideas as a result of the work I was doing. I was learning more and more about fascia and tensegrity and I had developed my own thought processes on the role of this system in our running form. However, I still attended conferences and seminars on fascia. I was still developing my ideas. I was still often the only running coach in a room full of Pilates instructors.

And that said a lot. Fascia is a big thing in the world of yoga, Pilates and massage therapy. It’s known about. It’s talked about. It’s schooled. Yet there wasn’t anybody that I was aware of who was taking what we know about

this amazing elastic system and relating it to our dynamic movement when we run.

James was keen to hear how I blended some of the anatomy principles into my coaching methods. I was nervous about how he'd react. He told me later that he was nervous about how I'd react to his lack of running ease!

It was a meeting of minds. We spent a couple of hours out on the track, with me filming James running and us discussing and evaluating his form and making some corrections. His self-consciousness faded as he took on board the coaching and started to move far more gracefully around the track. It was incredible to see him taking on the concepts – which of course made total sense to him – and applying them to what he was seeing in the video footage that I was showing to him.

It was when we'd finished the session and I'd filled James in on my experiences since we'd last met, though, that we started to dig deeper into some of the issues that I had discovered. I told him about my findings on negative nurture; the role of our mind when changing our movement; the influence of our perception of our movement on how we run; the importance of impact and height in our stride; the results I had seen with the likes of Tom Evans, Nicky Spinks and Damian Hall; and, in particular, my fears that the posture pandemic that I was seeing in the Western world meant that, despite these success stories, we were, as a general rule, devolving as a result of modern lifestyles.

I wanted to understand whether, for those of us who were already impacted by the effects of negative nurture, it was too late or whether – as I was seeing with a selection of athletes – we could still move as our species was intended to.

My concerns had also taken on a new sense of urgency. I was starting to see certain habits seeping into life in other parts of the world. Parts where I was otherwise discovering beautiful natural movement.

In my lifetime, the world has become far smaller. It is now more affordable and achievable to drop yourself into just about anywhere and this and the internet are having a massive impact on interaction and communication with other parts of the planet. When I first travelled to Nepal about 20 years ago, for example, I would have had to wait for days and days to get to a phone to call home. Now there are Sherpas complaining if they can't get a signal! When I went to India in search of people who

squatted rather than sat down, even travelling to the traditional markets, I struggled to find anyone. Plastic chairs had arrived and those who had previously squatted were now sitting down.

Iten – the home of so many amazing runners – was also, to some degree, at risk. Because of its reputation, people from all over Europe and America wanted to go there to train and learn. Don't get me wrong, it was not at all lost on me that I was one of them. However, I was also very careful to live the way that they did whenever I visited. I did my best to operate as they did. People in Iten had started to crave the lifestyle that we have in the Western world. So they wanted a TV, to eat a burger, have a nice pair of white trainers. It isn't for me to say that they shouldn't have those things but the concern I had was what these shifts in habit may ultimately lead to. Fundamentally, I was not only concerned about whether we in the Western world could still run like those East Africans but whether, in two generations' time, East Africans would be running like us! What we had fallen for, they were falling for. Uganda gave me a stark insight into this and I was seeing a similar pattern in other places that I visited.

I was adamant that we had to address this now. James was thankfully able to provide some calming words.

'I don't think we are devolving as a species,' he explained. 'I agree that on an individual level, we are facing issues and that they are linked to our daily lives. My hope is that the challenges that we face in our movement are not occurring as a result of the inheritance of acquired laziness throughout our species. Instead, I think we as individuals can and must consciously address our movement in order to break the cycle.'

James and I talked for a few hours, bouncing ideas off each other and considering the implications of the findings that I had gathered from my travels.

We had attended many summits and conferences on fascia together and learned some pretty groundbreaking things but it was the mention of one of the findings on a more recent workshop in London with the granddaddy of fascia, Professor Robert Schleip, that caused an imaginary light bulb to illuminate above my head.

'It's really down to us as individuals,' James said. 'We must remember Schleip. Our fascial system is constantly rearchitecting itself and, in as little as seven months, our whole system could be completely renewed.'

The bulb brightened as I considered the consequences of this statement.

Fascia is fluid. It moves and contracts. It also suffers if we let it be stagnant. That doesn't just mean extreme stillness, either. If our body makes the same movements or sits and stands in the same position repeatedly, our fascia will respond to that by stiffening. Equally, anything we do repeatedly will become our norm. Our fascial system will react and we will start to take on the resulting characteristics.

That means that if we sit at a desk hunched over a computer every day, over time that will become our default posture because that's how our fascial system is formed. When we stand up and walk around, we will still be inclined towards a hunched posture. When we run, we will still be inclined to hunch forwards. As a result, our ability to get into a beautifully tall posture in order to optimise the benefits from our elastic system will be severely challenged. We can try as hard as we like when we run and give it all of the guts and glory that we can muster but we will not be optimising our elastic system and will therefore be working harder than we need to.

Collaborating with athletes such as Tom Evans, Damian Hall and Nicky Spinks, seeing the recovery of Rory and working with thousands of recreational runners, I was watching over and over again the powerful moments when runners made changes to their movement and something clicked. We could see it in the footage. The athletes could feel it. We could see it in the data that I was picking up from the movement sensors attached to them. However, while I could get a runner thinking about their movement and making some changes in a single session, it took a lot longer for them to adapt to a new running style and for that to feel natural and comfortable.

It was all very well running with a good posture at the start of a run but it was when we tired – when our body reverted to its default setting – that we once again started showing the impact of our daily habits. I had seen runners trotting around like show ponies when we started a session but when I put them under pressure to keep up with me on a bike, for example, it wasn't long before they were heel striking and bending forwards at the waist again. That's not what I was seeing in Iten. There, even when that mountain bike was replaced by a 4x4, that incredible running form was a constant.

I realised that what we needed to do was change the default. To restore factory settings so that, as the runners' fascial system rearchitected itself, it did so in a way that made their standard everyday running form a beautiful, efficient and elastic one.

And here's the exciting part. If you met someone in the street whom you hadn't seen for seven months, they could potentially have completely transformed their fascial system. If you could see it, it's possible that you wouldn't recognise them!

The system that is responsible for our potentially synergistic, connective, fluid and elastic movement is never more than a few months old and continues to rejuvenate throughout our lives. Even if you can't do it now, your ability to run beautifully and with natural movement could be totally reborn in less than a year.

AQUATIC CENTRE, OLYMPIC PARK, LONDON

How you make a cup of tea is how you run.

Don’t worry, I won’t be following you around with a Pantone matching chart looking for the perfect shade of Great British brown to your brew. I’m not interested in the tea itself. It’s how you stand as you prepare it that really matters.

You think that’s a trivial example? Well, stay with me.

I had the privilege of being invited to work with the Great Britain diving team. They were looking for a fresh perspective on their diving techniques and were interested in whether I would be able to bring anything new to their training.

On my first day, I stood by the side of the pool with Gareth Ziyambi, the team’s senior physiotherapist, and Jane Figueiredo, the British Olympic coach. This is where we all stood to watch the athletes. Standing here made sense. You could see the whole routine from the same perspective as those who would be judging the athletes during a competition.

The athletes were judged on all aspects of their dive. The points system – which ultimately resulted in an overall score out of 10 – included points for take-off, the flight and how the diver entered the water.

For my work, it was the moment of take-off that would prove to be the most crucial focus. The trajectory of a dive is determined at this point and cannot be altered in mid-air. In fact, in that sense, it was just like a runner’s trajectory as their foot left the ground.

Just like when I studied the sharks, I wanted to get as close to my subjects as possible. My first request, which was met with a few raised eyebrows, was that I be allowed to leave the coaches by the poolside and join the divers up on the board. From this perspective, I could really see what was

happening. From that moment on, I was always up on the board with the divers.

Grace Reid has competed at a European and World Championship level and is, with good reason, one of the team's brightest hopes for the Olympics. Grace is exceptionally talented.

From my perspective at the back of the diving board, I noticed a common trait that presented itself every time she dived.

As the athletes prepared for take-off, they bounced on the board to build momentum so that they could get height as they executed their dive. As Grace landed during this rebound, her right foot came down a little bit earlier than her left and pointed outwards at a 45-degree angle. As a result, every time she dived, she dived very slightly off to her right.

I showed this to Grace on the video footage and she, as the consummate professional that she is, thanked me and said she wouldn't be doing that again in the future.

Grace proceeded to get back up on to the board to dive. To her annoyance, the footage clearly showed that she did the same thing again. So we moved on to a lower board where she could have a bit more control. But she did it again. Then on the dry board – which was the most controlled environment for diving – but she still did it.

As we stood discussing the video footage and how this was affecting her diving, I noticed that Grace always reverted to standing with her weight on one hip and her right foot poking out. Bingo! This was how she was standing. Not as a conscious stance but as a default position when she stood chatting. It was perfectly natural, then, that it's how she landed as a default when she was leaving the board.

I see this all of the time. So many of us do stand with most of our weight resting on one leg, leaving the other to be free. We feel more relaxed and less upright as a result. However, this constant weighting of one side can affect the way we move and because (as we know) our fascia breaks down and rejuvenates in the form in which we use it, it creates a learned behaviour that manifests itself when we move.

Jane and Gareth were immediately very excited about this new perspective but also nervous about what we then did with the information. They have since completely changed the way that they look at the movement of their divers; they now always film the divers from up on the

board and they also take a much closer view of their athletes when they are not performing.

The big message is that, however much she tried to get involved in changing the habit, even this Olympian could not change her footfall when in dynamic movement because her landing was so instinctive. And so we go back to the cup of tea. What Grace had to do was change the way she was standing. That's when she was chatting, when she was on her phone, when she was making a brew. By changing this habit, she'd be able to correct this particular idiosyncrasy in her landing. She needed to retrain her sea of tension by standing in a beautiful position with her foot forwards if she wanted to dive in that position.

You may think that's an extremely marginal gain but when you are training for the Olympics at such a high level – four years of hard work for a few seconds of performance – marginal gains can be the difference between a medal and no medal.

It's also not hard to see how this lesson could be applied on a much greater scale. If you extrapolate the example with Grace and apply it to people who are currently running with no awareness whatsoever of how they are moving and therefore every idiosyncrasy in how they sit, stand and live has potentially manifested itself in their movement, the potential for change – and thus the potential for gains – is far more significant.

Since this day, Grace has paid great attention to how she is standing and it is showing in the way she now lands on the board. And my view is that all runners should be taking just as much interest in their movement as these Olympians do. Everybody, regardless of whether they want to do a parkrun or run for their country, should be taking their movement as seriously. And because this aspect of performance isn't about fitness, everyone is on a level playing field. Everyone is trying to optimise the way they move.

How the fascial system rejuvenates is up to us. Put that in bold and double underline it if you have to. If we remain slumped at our desks and craning our necks to look at our phones all day, then our fascial system will break down and develop in that same posture and we will remain extremely challenged in our movement. If we move well in order to take full advantage of our body's natural elasticity, our fascia will respond and we will very quickly create a body that will allow us to do that naturally.

And that’s the thought process that set me on the way to one of the most important and inspiring discoveries I have made on this journey so far. It’s a discovery that I have seen realised by so many runners I have coached who have chosen to be students of their movement. It’s a simple message that drives a massive great double-decker bus through the concerns that I had in Uganda. It culminates in four of the most powerful words I have ever uttered:

It’s never too late!

ORSIÈRES TO CHAMPEX TO CHAMONIX (THE OCC)

I have heard many people say that it's too late. They didn't run when they were younger. They don't have the muscle memory. They couldn't possibly run well now that they are older. I don't buy it. I have seen countless examples to the contrary.

You don't have to be an elite runner to be an elastic runner. We all have the ability to be incredibly elastic in our movement, with both recoil and the creation of kinetic energy. Our fascial system creates a sea of tension that holds our body together. As we have discovered, this amazing system is constantly rejuvenating and it will rearchitect itself based on how it was broken down. So, if we start to move beautifully and live our lives with this in mind, we will develop a body perfectly designed for this skill.

This is not unique to the lucky few. When it comes to movement, whether you are new to running or an elite athlete, it's a level playing field. I've seen some extreme examples of this on my journey and none more so than Clare Molyneux.

When I first met Clare she was recovering from cancer and taking a treatment drug that was dramatically impacting on her joints. For her, running for any length of time was a challenge and running 'well' at any point seemed an extremely unlikely outcome.

'It was 11 March 2013,' she recalled. 'It's a day that I will never forget because it now marks a monumental turning point in my life. It was the day that the realisation hit. I was overweight and seriously unfit. Breast cancer diagnosis in September 2012, the year I hit my 50th birthday, had resulted in two operations, a month of radiotherapy and drug therapy. It had all taken its toll. I decided that I had two choices: buy a whole new set of clothes that were a size bigger or do something about it.

‘Thankfully, my clothes survived the deliberation.’

Instead of shopping, Clare booked herself in with a personal trainer and started her own journey. As part of the package was a running club. In week one, she ran 2km and then threw up over the side of a wall.

She persevered. By mid-June she entered a 5km race.

‘I jogged slowly around the first 3km,’ she recalled, ‘then had the urge to REALLY run. I crossed the finishing line wanting more but with everything hurting. I really had no idea how to “move”.’

At this point, Clare came to see me. I won’t lie, it wasn’t pretty. She was overstriding, throwing each leg out in front of her and fighting everything in her stride. If she hit any kind of gradient, she completely lost control. Her posture was slumped and she was smashing her heel to the floor with every landing.

First, we focused on postural alignment, keeping her head up and using her arms. We needed to get more height into her stride in order to get those legs landing beneath her rather than reaching forwards and heel planting. She took the ideas from the session with her.

‘The journey continued with practice, practice, practice and planning and the completion of a handful of 10ks and my first half marathon six months later,’ Clare explained. ‘Next, we worked on my downhill technique and cadence. I was running a bit faster and had more control. Most importantly, there was a reduction of pain in the joints. The drug that I was taking for the cancer was having a negative impact in terms of stiffness and pain in my joints, particularly in the shoulders, hands and feet. The big surprise was that the running helped. As I got stronger and my technique improved the pain eased and the other side effects were minimised. On a bad day, going for a run was the answer.’

This is when Clare made a huge decision that completely blew my mind.

‘The UTMB OCC was on my radar but had always been unspoken. I decided I was going to enter.’

To put this into context, Clare was running a few kilometres at a time. She was recovering from cancer. She had been, by her own admission, overweight and struggling to run at all. The OCC, which takes place during the UTMB weekend, is a 58km brute of a mountain race that is the envy and ambition of many a seasoned trail runner.

In order to gain entry, Clare would need to get some more experience and gain enough ‘points’ from qualifying races. She started to build her running with some trail half marathons, a full marathon and then a 50km ultramarathon. All the time, she focused on how she was moving, all the time she was honing her technique – treating it as a skill rather than a try hard slog to the finish.

After a two-year journey, she made it to the start line.

‘Standing on the start line in Orsières I had the realisation that this was a big deal. It was my time to put the techniques into practice and see where they would take me. It was all about posture, head position and using my arms.

‘The early kilometres were slow and winding, almost at times queuing up the hill, my eyes fixed on the nape of the neck of the guy in front – not because he had a particularly interesting neck, just to keep my own head position right! It was good for me, to keep me measured and everything in control. I was surprised how quiet it was. No talk, just the pad pad pad of feet and the clicking of poles sustaining a rhythmic cadence.

‘As soon as there was any sign of heavy feet, I focused on technique – “lift, use your core and keep that head in the right position”. You can’t beat that light and “floaty” feeling when you get it right.’

There was no denying that at times it was still a huge effort for Clare but she also found herself enjoying the experience.

‘The descent to Trient was one of the highlights of the course for me, combining tracks, root hopping and some rocks to negotiate on the way down. It wasn’t too severe and meant that I could put all of the techniques to good use – springy legs, head up and focused, and, most importantly, the quick feet over the rocks and technical sections. I hit the bottom feed station with my knees still loaded with bounce and the momentum took me straight to the next climb.

‘Four peaks down and the last climb up to Flégère was tough as we went up in the mist, grinding our way up over the rocks and boulders with darkness descending. Strangely, the dark made focusing on technique easier.

‘The lights of Chamonix were a welcome sight emerging from the forest at the bottom of the hill. That last run in was all about keeping my posture, maintaining head position, keeping landings soft and driving those arms to

keep my cadence high. It was my fastest kilometre of the day by far and my version of a sprint finish to pass someone on the way in. My competitive heart was still beating.

‘Then that feeling of crossing the finish line: elation, joy and the realisation that I’d done it.’

It felt like the end of a journey for Clare – a finish that seemed frankly inconceivable when I first met her. It was also a huge learning experience for me to work with her. Whether we are elite runners or just about to start a daunting Couch to 5k, we are all capable of incredible things no matter how late in life or difficult it may feel.

Clare’s journey isn’t over, either. She started late but she will not be written off.

‘I’ll never be the fastest out there,’ she laughed. ‘But with the techniques I’ve learned to keep me in balance, I aim to be one of the oldest.’

THREE-QUARTERS OF THE WAY ACROSS AMERICA

‘I sat there with my feet dangling over the edge of the hospital bed and my hands covering my face. I rocked backwards and forwards, sobbing uncontrollably. Although I knew there was only one decision to make, I didn’t want to give up. I didn’t want to be considered a failure by the world. I didn’t want to let my crew and my sponsors down. I still had my running kit on, for goodness’ sake! I knew that I could do the run but I also now knew that, if I did, it may well be my last.’

Mimi Anderson is one of the most well known and respected British endurance runners. Having struggled with anorexia for more than 15 years of her life, it wasn’t until Mimi was 36 that she started running on a treadmill in her local gym. Another 15 years on and she held Guinness World Records and had collected outright victories at some incredibly tough races, including the 6633 Arctic Ultra (a 352-mile self-sufficiency non-stop race in the Arctic), the Namibian Desert Challenge (a 220-kilometre, 5-day multi-stage race) and the Cyprus Ultra (a 217-mile non-stop race where Mimi was the only finisher). Add to that several races that she had not only finished once but had also completed as ‘doubles’, i.e. by running the race and then turning around to run back to the start. This included a double Spartathlon (that’s 153 miles, twice), a double Comrades Marathon (89 kilometres, twice), a double Grand Union Canal Race (145 miles, twice) and a double Badwater (135 miles, twice). Then add new female records (at the time) for running from John O’Groats to Lands End down the length of Britain (840 miles in 12 days 15 hrs and 46 mins) and the overall record for running from the top to the bottom of Ireland (345 miles in 3 days 15 hrs 36 mins) and you begin to understand why she was nicknamed ‘Marvellous

Mimi'. Running had become a defining part of her life and she embraced it wholeheartedly.

Injury is a fact of life for so many runners. With something as repetitive as our running motion, it is no surprise that anything we do that jars against our body's natural movement will soon go from a jarring to a niggle and then from a niggle to a full-blown injury. Again, we can invest in gear that promises to protect us or things to patch ourselves up, but we are just papering (or taping!) over the cracks. These products are simply not addressing the underlying causes. I cannot guarantee that injuries won't happen but I can confidently say that far fewer will happen if we move as nature intended us to move. Many of the issues we face as runners come from poor running technique. Just like I found in my early running days, the amount of miles we are packing in as training means that we so often turn up to an event half broken. We are putting ourselves at a disadvantage before we even begin. Recovery time is also important and allowing our body to rest in between activity is a vital factor in injury prevention. In Mimi's case, due to the world record attempt she was undertaking, allowing adequate recovery time when running an average of 57 miles a day was extremely difficult and the lack of it was likely a major factor in her latest injury battle. It was a battle that looked like it might prevent her from ever doing the sport she loved again. A sport that had taken her on another epic adventure in the first place.

'I was standing on the steps of the City Hall in Los Angeles,' she recalled. 'I was about to take on the biggest challenge of my running career: to run 2,852 miles from Los Angeles to New York in an attempt to break the female world record for running across America. A record that had stood since 1979.

'The logistics and planning had taken three years; my heart and soul had gone into it. Even getting to the start line in one piece had been a challenge.

'Five weeks into the run and already over 2,000 miles covered, the pain in my right leg was becoming unbearable. My right leg was bent inwards at the knee "valgus", which in turn was causing issues with my back and causing me to run with a lean to the left.

'On the 40th day, after only managing to walk 16 incredibly slow, painful miles, stopping way too frequently because of the pain, my crew decided

we needed to stop and get an MRI scan done on the knee. I was ahead of the schedule that I had set for myself and this needed to be sorted.'

Mimi's crew drove her to a hospital in Richmond. In her mind, there was still no thought of stopping. This was simply a blip. The doctor who gave her the results of the scan was very considerate. He didn't once tell her to stop. However, he did explain what could happen if she continued to run to New York.

'We all sat in shock at what we were looking at and what we were hearing,' she remembered.

Among other things, the scans showed that Mimi's knee was down to bone-on-bone on the lateral side. Should she choose to continue, she risked multiple stress fractures, with a high probability of needing a total knee replacement on returning home. She knew then that she had to stop.

'Several weeks after returning from America I found myself descending into a black hole, struggling to come to terms with what had happened,' she told me.

'I felt too ashamed to face the world, so I hid away. Gradually I found myself being able to be more positive, realising that the run wasn't a failure. Okay, I didn't achieve my goal, but I took on a challenge that many people wouldn't even have considered. I ran 2,217.2 miles (don't forget the 0.2!) over 40 days – that's three-quarters of the way across the third largest continent in the world – and, most importantly, was well in sight of achieving the world record. Again, there were very few people in the world who had done that.'

The long process of recovery began. Mimi's weight had dropped so the first few months were spent trying to return to her original weight while being completely starved of exercise. Even walking was painful and her energy levels were low. This was a dark time and when she did start to feel her energy levels returning, Mimi knew that she needed to be careful.

'I decided that if I was going to be able to continue any form of running, then I needed to get professional help with my running gait in order to take as much impact as I could off my knees.'

That's when Mimi called me. I'd first met her at the Ice Ultra and suggested then that we work together. I was so pleased that she wanted to take me up on the offer.

We met in Goring. I put sensors on Mimi and set up my iPad to record and film her movement. Mimi ran up and down a white line that was painted on the field as best she could and returned to watch the footage with me.

‘As we were watching it back, it was very obvious that I had a strong heel strike on my right leg (the leg with the knee issue).’

This had to be the main area of our focus. Mimi had massive problems with her right knee and so was heel striking on her right side and her foot was landing slightly pointed outwards. This was causing a big tracking problem for the knee because her foot was landing at a slight angle but her knee was facing forwards. Mimi’s homework was to cautiously start loading that knee correctly again. She had to be very careful because a lot of strength had been lost.

‘Once I had this information, we were able to adjust my running style in order to avoid putting so much pressure through my knees and to give my body more “bounce” as I ran. I was more upright and taking shorter strides to avoid any heel striking. I must admit it felt very odd doing this for the first time but I knew with practice it would feel quite normal.’

Although Mimi had a huge challenge ahead of her to even be able to run again, her mindset was shifting as she embraced these new techniques.

‘I had to accept that my long-distance running days were over. I was devastated, as running had been a huge part of my life for the best part of two decades, but I could either sit back and feel sorry for myself, or show everyone that regardless of what happens to you, you can pick yourself up, dust yourself down and find something that ticks some of the boxes. As long as the running I did was putting less impact through my body and was something that I could still enjoy, then I was going to embrace it.’

And Mimi started to make progress.

‘A few weeks later, I was prancing like a pony up and down my garden practising this new technique. Even my grandchildren joined in! It felt fantastic to be moving again.’

There are so many runners that I come across who have adopted an idiosyncrasy in their movement as a result of an old injury and they don’t even know they are doing it. If we can identify this early and make our reaction conscious, then we have a far better chance of readjusting our technique, running naturally and avoiding future problems. Even from the

extreme position that Mimi found herself in, there is hope that we can break the cycle. Something she went on to prove against the odds.

‘The feeling of total overwhelming panic came over me,’ she remembered. ‘It was the morning of my first triathlon!’

‘To be honest,’ she continued, ‘I tried to find any excuse to get out of it but I knew that I would be disappointed with myself if I didn’t go. Once the swim (the part I had been most dreading) was over and the bike section had gone well, I racked up my bike, replaced my helmet with a headband, cycling shoes for trainers, and I was back in my happy place: running.

‘As I began the 5km run my legs felt good. I ran past the marshals grinning from ear to ear. As I ran past other competitors, I would say “hello”, still grinning like a Cheshire cat. They must have thought I was totally bonkers. I didn’t care. I was on top of the world, back doing what I loved best. As I ran towards the finish line I was so overjoyed. My time or position was of no concern. What mattered was that I could run.’

CONCLUSIONS

Back at home, I reflected on my journey so far. I had set out to unlock the secrets of those runners in Bekoji but what I had discovered along the way was far more exciting than I could ever have imagined.

Running was not about the ‘no guts, no glory’ approach that I’d imagined it was when I first started out in the sport. It was a whole-body movement skill. And one that didn’t reflect the biomechanics that I’d originally been schooled in. Instead, I had learned about this incredible elastic system that we all have in our body. One that we, as runners, seemed to be widely unaware of and yet one that appeared to hold the key to our dynamic movement. I discovered that we as humans were born with the ability to be elastic, synergistic, fluid and connected. That if we could learn to engage this elastic system, we could create positive energy to propel us forwards.

I had also discovered that the ability to optimise this system was something that most of us had either lost or simply never found. How we lived our lives was having a defining impact on how we moved and, as we had become more and more sedentary, our elastic system had responded by adopting our bad habits. This negative nurture had changed the way we naturally moved and because the majority of us didn’t move with any conscious thought, we had carried these changes into our running form. As a result, many of us lacked anything that could be described as dynamic movement. We had also managed to convince ourselves that the injuries we were facing were down to the impact of us hitting the ground and so we had learned to suck ourselves down even further and created a whole industry around footwear designed to protect us against our own poor movement. We had become obsessed with gear and nutrition, with split times and kudos, with race T-shirts and medals, with new backpacks and the latest fashion in running gear. Yet, even though our search for marginal gains

would quite easily convince us to part with our hard-earned cash to buy a new gadget or pair of trainers that promised to improve our performances, most of us had completely failed to invest in the most base and innate aspect of our running. The thing that was closest of all to home and that would actually cost us nothing. *How* we run.

To be fair, I also discovered that changing our movement is not easy. Our body is used to moving as it does and our mind is rarely engaged in a conscious analysis of how we move when running. Furthermore, our mind would actively coach against us changing our movement and, as our perception of effort went up due to the focus required in engaging our brain, any new movement felt harder and less natural. I learned that we had to persevere through this challenge and become good students of our movement. We should be dynamic – adding height to our stride and not being afraid of impact (as long as we were dissipating it correctly). We had to change our mindset from a 'no pain, no gain' attitude to a more considered one. Every mile should be viewed as an opportunity to practise good movement. That way, we could focus on running well, ditch the junk miles, recover more quickly and be far more likely to remain injury free and ready to perform.

And, of course, the best discovery of them all. The elastic runners whom I witnessed on my journey didn't demonstrate attributes that made them subnormal or super human. They were born with a gift? Absolutely. They had developed in a way that made the most of that gift? Right again. The gift, though, was not unique to them. It was in their DNA but it was there because they're human. We are all born with it.

Running beautifully and with elasticity is not unique to the gifted few. It is not about natural selection. It isn't specific to a region or to a particular race. It isn't hidden in a particular corner of the world or nestling inside a dusty old book. The secrets of the elastic runners are hidden inside us all, but are easy to spot in those who make best use of them. Yes, I mean Kipchoge. Kipsang. Damian Hall and Nicky Spinks. Tom Evans. And I also mean Rory and Clare. It is probably some of the people hidden in your local running club or at the race you just did. These people shine in the spotlight, in some cases far beyond their own expectations, before disappearing into the shadows again to live among us. That's because they have all learned to optimise this amazing body that we as a species have been gifted. One that

is constantly rearchitecting itself and that we have the opportunity to influence and shape by taking ownership of the way we live and the way we move in everyday life.

However we currently feel, we all have the ability to unleash our running potential by being dynamic, elastic and even flamboyant in our movement. It's not about *them*, it's about *us*. It's not a question of *who*, it is quite simply a question of *how*. And it just so happens that giving you the tools to become an elastic runner is precisely where we're going to next.

PART II

THE FOUNDATIONS

THE FOUNDATIONS

If you run, you already have a deeper connection with yourself – a deeper connection with the world – than those who don't. You have already experienced moments of utter childish, joy-evoking freedom, moving forwards powered only by the gifts that nature has given you. In those moments, you have been stripped back. Away from a constant connection to texts and tweets, from posts and likes, from hashtags and kudos, from the incessant dripping of emails, from the ringing of the phone, from the commute, from the materialism, from the Black Fridays and Cyber Mondays, from the stress of work and the comforts of home. Instead, you have experienced a connection that is far more deeply rooted in time. A connection to your body and to your surroundings, to your physical and mental potential, to what makes you who you are and what you are, to what makes you human.

If you run, you know what it feels like as your thoughts become ordered and your mind clears. As you unlock that next level of wakefulness and awareness that is otherwise almost impossible to access in everyday life. That place where clarity reigns. Where you are meant to be. Where you feel like anything is possible.

If you run, you already understand what it's like to crave that feeling over and over again. To want to get back in touch with that version of yourself. The one you relate to more than any other.

If you run, you know what it's like to see a narrow path meandering across a field and have an overriding urge to follow it. You know the desire to explore. To see where the path leads. To find the next trail and follow that as well. You know what it's like to start an adventure and to bathe in deep contentment once you've had your fix.

If you run, you know your body. Every footfall. Every ache and pain. Every need for sustenance and oxygen. The burning lungs and cramping muscles. The sweaty brow and nettle stings. The found fitness and lost toenails. All of this is accentuated as you push through that morning interval session or tackle those hills of outrageous fortune.

As far as I'm concerned, if you have truly lived – if you have truly connected with *what* you are and *where* you are in the world – it's because you run.

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We must never lose this. My journey has never been about drowning out the purity of running with science. As the athletes whom I have worked with will (hopefully) all attest, this is not about complicating things or giving you a thousand different techniques to remember so that, somewhere along the way, you lose sight of why you started. It's quite the opposite. It's about bringing you even closer to these experiences. About getting to know your body even better. About getting even more in touch with what makes you human so that you can do what humans are designed to do in the way that we are designed to do it. This is about rediscovering the techniques that we, as a species, are physically built and mentally wired to undertake. It's about freeing you to do what you love, so that you can feel an even deeper connection with yourself and the world. So that you can do it more often. Be injured less. Go further. Go faster. Feel that flow. Enhance, rather than detract from, your love of running.

Running is an art. Yes, there are ways to do it that will still be like running. You will still move forwards at a quicker-than-walking pace. You may still experience many of the feelings that are described above to one

degree or another. But what we have seen so far on this journey is that, if we take ownership of our movement, we can truly discover an art that is fast becoming lost to us as a species and, in turn, we can reap the rewards in terms of both performance and enjoyment.

If we don't think about something, it just happens. That's why we slouch. That's why we move with a lazy inefficiency. That's why most of us sit badly when we are driving or working at a desk. It's because we don't consciously engage and our subconscious reverts to a default setting. We then become extremely efficient at moving inefficiently and, as a result, changing those habits gets harder.

Our default position should be the one that has us primed and conditioned to move well. In order to move beautifully as our default, we need to move beautifully over and over again. We must ensure that this is ingrained in our being so that our elastic system – which we know is constantly rearchitecting itself – will rejuvenate and that beautiful movement will become our default setting.

We have the potential to tap into a free energy source. I see so many runners working extremely hard – almost like they are continually shovelling coal to fuel their exertion. If you take that analogy and consider the alternatives that we now have to coal – such as solar power, hydro power and wind power – it seems almost nonsensical. When it comes to running, we can keep shovelling the coal and working hard for it or we can try to take advantage of the natural energy source at our disposal.

Balance and symmetry beat power any day of the week. Muscle power is a very limited resource. If we run beautifully, we not only reduce the amount of muscle power that we use but we also have the ability to save energy and, more importantly, create it. This is a resource that's free and limitless as long as we establish a system to utilise it. Think of yourself as a hybrid car. You run fuelled by oxygen and calories (the petrol, in this analogy) and the movement you make creates elastic recoil, resulting in kinetic energy (or the electric in the hybrid car). You have the ability through your fascial system to create and store this energy so that you can utilise it as you move. It's like having a dynamo inside of you. With height, balance and symmetry, every movement you make invests in the next one.

When I coach, I provide a set of clearly defined cues so that runners can visualise what they are trying to achieve, why they are trying to achieve it

and, as a result, will go out with the best possible chance of being in tune with their natural movement each time they run. I cannot be there every step of the way but I can arm athletes with the foundations to allow them to take these cues and quite literally run with them.

I am fortunate to have worked with so many incredible runners – in terms of both talent and their ability to endure. As we continue the journey, they are going to tell you about their experiences travelling to some of the toughest and most renowned races and challenges on the planet. In the process, we will explore the cues that I use in my coaching. Cues that encourage beautiful, efficient movement. Cues that have allowed these runners – and if you adopt them, can allow you – to join in with the body's natural resource of elasticity.

I want everyone to become a student of their movement. In a world that's now dominated by camera phones and selfies, blogs and vlogs, we have more access to the tools that we need to analyse our running than ever before. It always amazes me, then, that as much as we post pictures and videos of us running on social media, very few people video themselves (or ask a friend to video them) for the purpose of analysing how they run. The number of people who come to see me for video analysis and are genuinely shocked when they see footage of themselves running is quite incredible. It's not that they are arrogant or expecting to see a Kipchoge-like running gait played back to them, but there are things that they are simply unaware of. Completely and utterly subconscious things they do that they need to see to believe. A foot sticking outwards as it lands or a wayward left arm that moves like it's conducting an orchestra. Most of them have never seen these things before because they have simply never looked. There isn't a runner in the world who wouldn't benefit from seeing themselves run. I encourage you to do this as much as you can.

Finally, as we look at the various cues, be mindful that they all work in conjunction with each other. If you take just one element of your form and work on it in isolation – as so many people do – I very much doubt that you will find it an easy process. As Simon Bayliff (one of the runners whom we will meet later) put it when I discussed this with him: 'Every element of it is part of the chain. It's a large equation. If you remove pieces from it, the result will not be the same. You can't just improve your cadence, for

example, and expect to feel that flow. You need all of the other elements as well. You need the full formula to get the output.’

FOOT PLACEMENT

The foot is the link between us and the ground. It is a highly complex information-gathering interface, taking full advantage of the dense concentration of nerves that end on each of our soles.

In running, the foot has five big jobs:

1 to create stability
2 to optimise proprioception from the nerves
3 to optimise elasticity
4 to optimise the dissipation of impact
5 to control the level of deceleration and forward propulsion as we move

Running literature – and particularly the internet – is awash with conflicting advice on what constitutes the best way to land the foot when we are running. However, before we get into specific techniques, we should really understand why the foot has such an important role to play in our movement. And there's no better way to understand the importance of something than by looking at what happens when it's no longer there.

Marathon des Sables, Morocco

'It was the final day. I'd arrived at the tent after 30 hours of running 86.2km in the brutal heat of the Sahara. It must have been morning by the time I put my head down. I'd slept fitfully. Waking whenever I moved in my sleep and my aching muscles hurt. Waking whenever my blistered skin brushed the material of my sleeping bag. The strong wind had filled my eyes with hundreds of tiny grains of sharp, irritating sand, leaving them stinging and swollen. My hamstrings were in one of two states: either aching or in

spasm. I was battered and beaten down by dehydration and heat exhaustion. Moments before the start, I'd vomited, emptying what was left in my stomach on to the hot golden sand beneath my feet and, in turn, denying myself the crucial nutrition that I desperately needed to get me through the morning. In summary, I was done.

'I took out a piece of folded paper from my pocket and opened it. I read the same message that I must have read a hundred times that morning already. It was from my daughter, Lilly. It just said: "You Can Do It."

'With a lump in my throat, I hauled myself up and made my way to the start line. I repeated my mantra to myself over and over again in my head: "Defeat is not an option."

'I'm not saying it was easy but somehow I got through that final marathon. I kept focusing on how my body felt, kept adjusting my posture to make myself as balanced and efficient as possible. And then the finish line appeared in the distance and I knew that I'd made it. I was the first double amputee ever to finish this iconic race.'

I first met Duncan Slater at his home in Norfolk. He opened the door in his running blades. I'm not short but I had to crick my neck in order for us to make eye contact. Duncan is a towering former soldier with a friendly and infectious personality. He has been through a lot. In 2009, while out on a routine patrol in Babaji, Helmand province, Afghanistan, his convoy was hit by a roadside bomb. Duncan took the brunt of the blast. Twelve months of rehabilitation followed before Duncan was told that his legs would not be of any use to him and the difficult decision was made that they should be amputated from below the knee.

Unless something as traumatic as this has happened to you, it is difficult to understand the physical and emotional impact. Duncan's reaction was eventually to get himself walking on prosthetic limbs and to then take on a series of extreme challenges that any person would find tough. His goal was to prove that he would not be restricted. He has certainly achieved that.

When we first met, Duncan was training for the London Marathon. At the time he couldn't run more than 6 miles without the stumps of his legs bleeding as they rubbed against his prosthetics. I had offered to help.

As a general trend, we tend to run around with lots of asymmetry in our movement. It's our proprioception that sorts out a lot of those problems for

us. This amazing self-levelling system relies heavily on constant information from the foot, which sends signals to our body.

Think about that when you next run. If we can just get the foot landing well, a lot of the work is done for us. Those quarter of a million nerve endings on the bottom of the foot send information up into the body and the majority of that information never makes it to the brain. The conscious mind doesn't get involved. The body just acts on it. That's why Rory Coleman, when he was learning to walk again, couldn't recall how to do it even though he had not suffered any memory loss.

Without feet sending this information to his body, Duncan had very limited proprioception and so there was very little self-levelling happening. In terms of the distribution of the impact that he was putting through each of his legs, Duncan had a 49 per cent differential between his right and his left leg. It was the biggest I'd ever seen. The average able-bodied runner presents on average a 5 per cent differential. You do see able-bodied people up to 12–15 per cent but anything more is normally resolved by the body using the information from the feet to autocorrect.

Without that information, Duncan was going to have to find a different way to address the imbalance. He had no choice but to get involved. He would have to do everything as a mental process and create this balance further up his body with conscious effort.

We set to work. I videoed him and put movement sensors on him so that we could see what was happening when he moved. We then made some adjustments to his posture and tried again until we started to see some improvements in his balance. It was trial and error and a painstaking process, both on a physical and mental level, for Duncan.

As far as I'm aware, we were the first people to capture impact and deceleration data from sensors placed directly on prosthetic limbs. Just by changing his posture and getting his prosthetics landing underneath him and loading them well, we started to see some vast improvements. We were rebalancing his movement and by the end of our work we had got Duncan to a 12 per cent differential. That's near enough able-bodied status.

Duncan completed the marathon in five hours. With better prosthetics, he would have almost certainly been quicker.

In 2013, Duncan then built on this success by becoming part of a British team of wounded servicemen (famously joined by Prince Harry) racing

across the South Pole as part of the Walking With The Wounded charity. As we have seen, he then went on to become the first double amputee to complete the Marathon des Sables.

I came away from this work – and my corresponding work with amputees at Headley Court (a rehabilitation centre for injured members of the British Armed Forces) – with an overriding sense that the foot is far more important than I had ever realised. How it lands when we run is vital in determining our resultant movement. It also highlighted how much we rely on our body to correct inefficiencies in our movement. Our body might be clever in this respect but at what cost? If we are running around with all sorts of idiosyncrasies and landing badly, not only are we sending all sorts of strange messages to our body but we are also asking our self-levelling system to sort out a bunch of these problems for us. Relying so heavily on our proprioception comes with an inevitable calorific and physiological penalty. This was accentuated in the case of Duncan because he was having to consciously address these issues, but that's not to say that addressing them without conscious thought is trouble free. Rather than relying on our body to remedy these issues for us, we need to land well and we need to put as much balance and symmetry into our movement as possible. Like those runners in Bekoji, we should be ensuring that we get our whole body moving and that we are conditioned to run, so that when we come to do it, our body is not having to compensate for our inefficiencies. That means we can use this energy elsewhere – perhaps to make us run faster or for longer – rather than wasting it on correcting our form.

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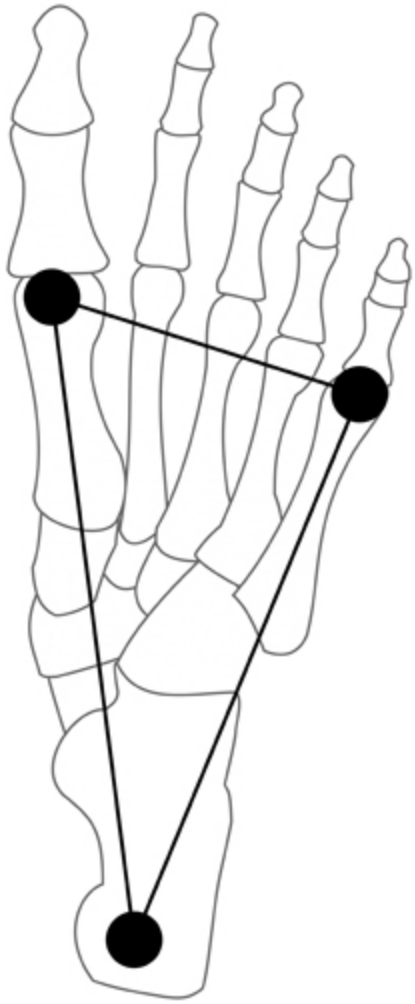
So, what is the best way to land when we run?

The foot is one of the most fascinating structures in the human body. When we run, it is our interface with the ground and the conduit from which everything else flows. Its intricate construction contains 26 bones, 33 joints and more than 100 ligaments, tendons and muscles. It is capable of withstanding forces of up to eight times our bodyweight and a complex web of muscles and fascia allow our foot to flex and articulate in order for us to maintain balance. When we stand, an amazing set of arches in the foot combine beautifully to create a natural dome for us to rest on.

After many years of researching foot contact in a multitude of environments on athletes, tribes and indigenous people, I believe that the best way to land when we run is to utilise that dome and the natural stabilising effect of the arches that form a tripod on the bottom of the foot. I therefore strongly advocate that we use what I call a ‘tripod landing’. That means landing on this natural dome with a full foot and not, for example, striking the ground first with our heel or landing only on our forefoot.



A tripod landing

While I don’t encourage us to envisage our body as a mechanical or static structure, there’s a very good reason why architects have, for years, been using domes and arches to create strength. This is because the load is carried outwards. The natural arch in our foot provides stability and

strength and is therefore the best platform from which we can dissipate impact and create propulsion.

Imagine a bowl dropping to the floor. As it hits the ground it lands with the whole lip of the bowl contacting the ground at the same time. The bowl makes a hollow pop as the impact of landing dissipates all around the edges in equal measure. Chances are, nothing will break. However, if the bowl lands on an edge, there is a good chance that it will damage or snap in the area that takes the brunt of the landing force. We need to apply this principle when we consider how best to dissipate impact through our foot.

Heel striking is one of the most common issues that I see with runners. Normally, it is accompanied by a leg that strides forwards and lands straight, with the heel creating a hard stop as we land. That is by far the worst way to dissipate impact. All of the force from landing will go up through that straight leg, sending shocks through your ankle and knees and making next to no use of the natural elasticity in your body. If you are heel striking and not getting injured then I believe it is more through luck than judgement. And even if you are not getting injured, that's hardly a high-water mark for good movement. You are still, no doubt, moving inefficiently.

Every runner – even world record holding marathon runners such as Eliud Kipchoge – will decelerate every time their foot strikes the ground. Our job is to manage those levels of deceleration. Every runner can work on this but, with the sensors I have used in the field on thousands of runners, I can confirm that those landing on a heel are decelerating the most. The heel acts as a hard stop, disrupting our flow and ensuring that we have to put far more energy into our recovery from each footfall. That comes at an energy cost but also puts far greater strain on our muscles and generally on our body. Overall, if we are heel striking, we are making running very hard work and most likely beating up our body in the process.

Many of the people who come to me for help with their running – most of whom are heel strikers – get a real shock when I break it to them that they are not actually running at all. Yes, they're moving energetically and, in most cases, relatively quickly. However, with one foot always on the ground and little to no height in their stride, what they are in fact doing is walking. We are designed to land on our heels when we walk. Naturally, then, if we always have one foot on the ground when we run, it's likely that

we will land on our heels. I am well versed in this. Remember those runners who left me in their dust in Bekoji? I was putting so much effort in as I tried to keep up with them but it wasn't a fair fight. I never stood a chance. I was essentially chasing after some of the fastest runners on the planet doing what can only be described as an energetic walk.

As we have seen, one of the reasons why we end up with this fast walk is our fear of impact. As we run, our foot making contact with the ground creates a ground reaction force of around two-and-a-half times our bodyweight. It's not surprising, then, that impact is seen as the runner's nemesis, responsible for injury and taking the fun out of running. I would not advocate massively increasing the amount of impact that we create. However, what I have commonly seen is swathes of runners pitter-pattering around as if running on thin ice because they are afraid of the ground. As a result, they are creating next to no bounce.

My journey has convinced me that we must make impact our friend rather than our enemy. Every time we make contact with the ground, it's an opportunity to create elastic energy and we do this by loading our body and propelling ourselves forwards using our elastic system.

In my work, I have been convinced that we are capable of creating elastic energy by utilising impact without necessarily putting more of it through our body as we land. As I see it, if we run a marathon, we are undertaking around 35,000 strides. That's 35,000 x two-and-a-half times our bodyweight coming back at us. We can either use these 35,000 opportunities to load our body well and create elastic energy to propel us forwards or we can suffer all of that impact, which will in turn slow us down and potentially hurt us.

Here's an extreme example. Pavel Paloncy, a Czech national experienced in endurance events, is not an obvious candidate to be an elastic runner. He is known as 'the Bear' on account of his tall and well-stocked frame. While his strength no doubt aids his performance, Pavel's efficient movement is key and he has worked with me to perfect many techniques, most notably his foot placement. For my first opportunity to work with him, I visited his homeland.

Šumperk, Czech Republic

It was like a scene from *Rocky IV*. As I arrived at the bright utilitarian gym in the centre of town, I could see Pavel in the corner, all Ivan Drago-like, strapped up to a series of elastic cables that were bolted to a cold brick wall. He was pumping his legs and arms like a restrained animal, using the bands for resistance. Sweat permeated the air in a fine mist and Pavel emitted the occasional deep guttural grunt as he reached the end of his reps. There was a long lead running from a clip on his ear and other leads attached to electrodes stuck with pads to his body and arms. They were taking bloods, testing his lactate threshold and downloading, collating and analysing multiple performance measurements. It looked like we were in a laboratory and they were constructing a superhuman athlete.

Pavel is a gentle giant. A cheerful and intelligent individual who is a part-time translator and full-time adventure addict. His translation work can pretty much be done from anywhere and, as with everything else he does, Pavel tends to take that to the extreme, working from wherever his next challenge has taken him – from a camp nestled in the mountains of Patagonia to a shared tent in the middle of the Gobi Desert. He is also super dedicated – whether it is a long single-stage ultra, a multi-day stage race, an adventure race or an obstacle-course race, he will meticulously apply himself to it. As a result, Pavel has done them all with great success.

My work with him has involved preparing him to move as efficiently as possible so that he can specialise in long and hard endurance events. And, as Pavel explains, there aren't many harder events than the non-stop 268-mile footrace that meanders up the backbone of England in cold and often brutal conditions: the Spine Race, more commonly simply called 'The Spine'.

'This is where it all started,' Pavel explained. 'Even though I have been an adventure racer since 2006 and have competed in hardcore expedition races in extremely wild places, including Patagonia, the Brazilian jungle, the French Alps and the Pyrenees. Even though I have a long orienteering background. The Spine in 2014 was a new beginning.

'For the first time in my racing career I attempted something that long on my own. Flying solo. My concerns mostly were not about physical preparation but about mental readiness. If you race in a team, there is always someone to talk to. If you run into trouble, there is always someone to help you. And you are there for others, too. That's teamwork and it's the

essence of adventure racing. But The Spine was different. If you discount the hallucinations, there's no one there to help you. No one to ask or to lean on. You are out there on your own. Add to that the brutality of an English winter on the ice- and snow-laden Pennine Way, very short daylight, unforgiving bogs, strong winds and a lonely, isolated solitude and self-navigation, which can become tricky with thick British fog on low (to no) sleep.'

Pavel, though, excelled. He won and broke the course record by more than 16 hours. He has since won the race another two times and finished in the top three on several other occasions. It was his analytical mind and attention to detail in his preparation that fascinated me and brought us together.

'Coming to The Spine with an orienteering, adventure racing and ultra-trail background – which are all really small sports – taught me that I had to do many things on my own. This isn't football or tennis with hundreds of supporting staff, physiotherapists and coaches, where all is taken care of. This also means that there is not much research available and so I had to do research myself. That works great for me. I have always been curious about how things (including the human body) work. I was lucky to have met Josef Andrle (whom I call "Pepi") early in my life. Pepi is a former ironman triathlete and now coaches many top athletes in different disciplines. What makes him unique is the combination of erudition, a constant strive for progress, ongoing self-education and drive. So for him, coaching someone from such a specific sport was a challenge and his analytic attitude resonated with mine. When asking the question "How to be a better athlete?", we realised that getting fitter is only one part of the equation. It is not only about physical performance – and even much less about gear – but also about efficiency in the way you move, in running and moving patterns (as well as about energetic efficiency, the metabolic system, nutrition and such).'

I first met Pavel when we were both invited to join Mohamad Ahansal's training camp in the Sahara. We immediately discovered that we were asking many of the same questions, only from different perspectives. Pavel felt that he had to bring Pepi and myself together.

'It felt like a brainstorm,' he said. 'Or perhaps even a perfect storm!'

So that's what brought me to this gym. Pepi stood in the corner gathering data. A tall, thin, bespectacled Czech, he has been responsible for training athletes, including rock-climbing star Adam Ondra, to both national and world titles and is clearly blessed with a scientific and analytical mind. I was looking forward to discussing my ideas with him.

Being completely honest, in our first videos in the Sahara, Pavel was heel striking, bending forwards at the waist (which is a common trait of tall runners) and he wasn't using his arms to drive his movement. He's a big guy and he was creating a correspondingly large amount of impact but not accompanied by much in the way of vertical oscillation (i.e. height in his stride). Given the scale of the races he was doing, we really wanted to work on him being as efficient as possible in his movement.

First, we looked at his heel striking and the heavy levels of deceleration that he was experiencing as a result. We could see it clearly in the data from the sensors that I attached to him. This was a universal measurement that both he and Pepi could see and understand.

For Pavel, the work we did and the discussions we had with Pepi meant immediate results.

'I have to say that I am naturally a very untalented athlete when it comes to movement coordination,' he recalled. 'I have to work very hard on these skills. But thanks to my ongoing core and balance training with Pepi I could immediately replicate the changes and I could see an immediate impact. What was more, the movement sensors we used meant that the changes were not only visible but measurable. My analytic soul of a scientist felt like I had discovered a new toy. I loved having new data to analyse!'

We also needed to find a way to get Pavel's feet landing underneath him. The best way to achieve this was to get him to put more height in his stride.

By the end of the session, we were able to put 1.5cm more on to his vertical oscillation, allowing his legs to turn over and his running chain to end with a tripod landing. He now had a slight bow from his chest (rather than leaning forwards from his waist) and he was immediately taller and more tuned into his elastic system. He could feel the difference and it was visible to all three of us in the footage.

And here was the biggest finding. The one that we should all take note of. Particularly for a big guy like Pavel, you would think that adding so much height to his stride – in this case, another 20 per cent – would create a

correspondingly large increase in the amount of impact we were seeing when he landed. But that was not the case. By utilising a tripod landing, Pavel was now decelerating far less and, what's more, we were seeing less than a 3 per cent increase in his impact on landing. So, to summarise, he wasn't hitting the ground much harder than before yet the airtime he was gaining was allowing him to radically change the way he moved. He now had time to cycle his legs beneath him and create flow. All I could conclude from this was that, if a guy built like Pavel could create more vertical oscillation without adding much by way of impact, then surely we all could?

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As we have seen through my work with Duncan, our feet are the ultimate proprioceptors due to the quarter of a million nerves that end on each of our soles. A tripod landing therefore maximises our proprioception, defining our position in the world, the movement of our body and our balance. Limiting our proprioception – which we do if we don't land with a full foot – can have a hugely negative impact on our movement. Our five basic senses – sight, smell, taste, touch and hearing – enable us to perceive the world around us but I have long thought that, in proprioception, we have a sixth sense. In fact, when it comes to our movement, this may actually be the most important sense of all. Even more important than sight. And, through my work, I have been very fortunate to witness what changing our movement can be like when we are quite literally running blind.

New York, USA

'I remember it so vividly. We were running over a bridge soon after the start. There was the dampened sound of footsteps all around us. I could tell that we were surrounded on all flanks. The metronome was ticking away as we moved to its beat. It just felt so comfortable and so smooth. We were overtaking people and we weren't even trying. And there was heavy laboured breathing all around us. I remember that. But otherwise it was quiet. There were no crowds of spectators because we were on the bridge and it just felt really calm. Really good. Then I remember us passing some

workmen on the right-hand side, and the voice on Strava kicking in to tell me our pace. I was shocked.

‘Caz,’ I said. ‘I think we should slow down.’

Eros Adamides started losing his sight at 20 years old, while studying in London, and was completely blind within three years. He now works as a software developer for a bank in the City of London. He and his running guide, Caroline Underwood (‘Caz’, for short), came to see me shortly before they ran the New York Marathon. I was not just delighted to work with them but also fascinated to see if I could help.

‘Before the session, Eros and I were running together side by side with a short tether between us and it was great fun, but running as a pair raised some serious challenges,’ Caz recalled. ‘We booked the movement session because we hoped to improve our individual technique but also for an analysis of us both running together as a pair.’

I’d met them at a park and immediately got them moving together so that I could see what this was like.

‘The outdoor setting meant that we could run together with the tether as in a real life situation, which it would not be possible to do on a treadmill,’ Caz remarked. ‘During the workshop we quickly identified areas where we could improve our running form. The focus was on cadence and posture to maximise the elastic potential of our individual bodies. In terms of running together, we were evidently in sync but heel striking and swinging our outer arms across our bodies like we were trying to hit each other. We worked on some visualisation strategies to address and correct the areas of weakness, both individually and as a pair.’

‘For me,’ added Eros, ‘the biggest initial shock was that what you think you’re doing and what you’re actually doing are two different things. You often imagine yourself being this athlete with graceful movements … but in reality you’re trying to punch your guide; and your guide is trying to punch you! I was imagining myself striking the ground with the ball of my foot and my arms making a determined square movement framing my body at 90 degrees. But the reality was very different.’

There were some obvious challenges in coaching. First of all, as Eros was blind, I couldn’t use my usual visual aids to get him thinking about his movement. Or at least not in the way I ordinarily would use them. The idea of videoing them running and showing them how they were moving and

how they could change their movement using this footage was out of the window, at least as far as Eros was concerned. When they were moving together, Caz and Eros were already in sync – matching their cadence and arm swing perfectly and moving as a unit. Our challenge, if we were going to alter their individual gaits, was to ensure that they continued to move together, otherwise there was the potential that they would suddenly be challenged by the presence of one another. This was going to need a whole new approach.

Have you ever tried to do a simple movement task – such as standing on one leg – with your eyes closed? Even this can be challenging. That's because you are immediately required to rely on your proprioception and you are most likely not used to doing that without sight. How you feel that you are standing and how you are actually standing are likely to be very different. If you tried running with a blindfold on, the last thing on your mind would probably be your running form – most people would just be struggling to move at all and their mind would be occupied by fear of what they might be about to run into.

Having said that, as we were working on the assumption that the brain doesn't see or hear movement, then actually not being able to see wasn't necessarily the big barrier that you would have thought it'd be. It could even be advantageous as the person may be more receptive to how things felt rather than what they looked like in a video. As I was working on the theory that our movement was based on our perception, I really wanted to see how I could change Eros's perception of his movement without the use of visual aids.

My first job was getting him to understand the elasticity in his body and to get him running upright. Anyone who walks with a cane generally hunches over slightly, almost creating a tripod as they lean forwards. It's understandable but almost inevitably going to create poor posture. As a result, they would naturally run bending forwards from the waist. The first thing I did was to connect elastic to Eros's feet and up to his head and get him to stand beautifully tall while holding the elastic, thus creating tension and replicating the James Earls demonstration so that he could feel it and visualise it. This worked as an analogy for the elasticity in his body and showed him what running tall would be like for his elastic system.

He really got it.

I also got him to play with a tensegrity model – demonstrating a hands-on analogy for the relationship between his bones and the fascial system – and got him to be very tactile with a model of the foot in order for him to understand, through feel, how his foot was built and why he should be landing on the foot's natural dome rather than the heel.

Finally, I needed to find a way for Eros to 'see' that he was heel striking. To understand how that manifested itself. To feel it as he was running and to realise how it looked and felt when he landed differently.

I had an idea. When we put our fingers in our ears, we can hear what's going on in our body so much more clearly. The sound of our breath or our own voice is significantly amplified. I went to the car and took out some noise cancelling headphones and placed them over Eros's ears. They weren't connected to anything but by blocking out all background noise, we created a body connectivity that allowed Eros to clearly hear his footfall and, most importantly, hear his heel striking the ground. Due to the way that the nerves are distributed on the foot, we know that proprioception can trick us because there aren't any nerves on the heel and so we don't always know that we are heel striking. We needed Eros to hear his heel strike in order to replicate the clear message that most people got when they saw themselves on the video footage. With this audible aid, Eros was able to dial right into how and how hard his foot was landing through this body connectivity.

'It was brilliant,' Eros remembered. 'It allowed me to actually hear when my heel was striking the ground and what it sounded like when I landed with a full foot, which was a much softer sound.'

It really was amazing to witness. After this session, I even started using this technique with sighted runners who were struggling not to heel strike (and I would encourage you all to try it). For Eros, of course, it took incredible bravery. We now had a runner who couldn't see anything and actually now couldn't really hear anything either. He was running in a park with my word that there wasn't anything immediately in front of him that he could collide with. But you could see him visibly changing his movement – cycling his legs beneath him – and experimenting with the changes in sound as his foot landed. He stopped heel striking purely based on sound.

Understanding all of this was one thing but putting real changes into practice was another.

‘After the workshop,’ Caz recalled, ‘Eros and I went for a run together straight away and tried all the techniques from the session but we really struggled to bring it all together, especially correcting the arm movement. But then we went off separately and tried the techniques out on our own – Eros ran on the treadmill and I did a run around London. Based on the discussions we’d had during the session, I had some weird and wonderful visualisations going on – prancing dressage pony legs with bouncy plastic cone shoes, springy elastic arms and “om” fingers. It felt like a very strange combination but seemed to work very well. I ran 12km in under an hour at an easy pace. It felt completely comfortable and I wasn’t out of breath at all. It felt really good.’

‘Then I got jealous,’ Eros joked. ‘I was like “How can she be running like that?!” OK, not exactly jealous but I was surprised that it could make such a difference.’

Thankfully, shortly after arriving in New York for the marathon, Eros and Caz had one last chance to run together before the event.

‘We were zooming along,’ Eros explained. ‘I remember it was really humid that day so I didn’t feel like I was doing very well but then the voice on Strava popped up with the pace and I was shocked. The fact that I was putting in less effort but felt comfortable in going faster was really confusing. I think that laid down the foundations for the start.’

And so they found themselves on the start line of the New York Marathon. ‘On the day of the marathon,’ Caroline recalled, ‘we had a mammoth journey to the start line, on a coach, in what felt like hours and hours of traffic. Then it dropped us off and we walked to the start area through airport-style security checkpoints. I remember having to take my gels out of my pockets and putting our bag, with Eros’s cane, through the scanner and we had to go through a security arch. On our way to the start all the photographers wanted to take a photo of Eros – and they all asked us to show our race numbers but it was so cold we didn’t want to take off our hoodies! Then we went to the AWD (Athletes with Disabilities) area, which was quite near the start. I remember walking up to our start pen with all the other AWD athletes and guides and there was a guy just behind us wearing white raver gloves telling us this great story about how he grew up in New York and was really excited to be running the marathon again as he hadn’t done it for so many years.

‘We were one of the first start waves, just behind the sub-elites. We could hear the national anthem being sung, then the gun going off for the elite start, which was pretty exciting. The elite runners were on the higher level of the double-decker bridge, then the sub-elites started on the lower level of the bridge, just before us, and our start followed just a few minutes after. We began shuffling forwards slowly. Eros started the metronome, which we couldn’t really hear at that stage over the noise of the crowd.’

For Eros, this was a very different experience to running around a quiet park in Goring with me filming him. The noise and the atmosphere created a busy, almost overwhelming soundtrack. Caroline explained what happened next.

‘We started on the lower level of the bridge. I had heard this myth that people peed off the top so I was trying to guide us into the middle of the bridge so that we didn’t get wet! I don’t know if it’s a real thing but, in any event, it wasn’t an issue. Once we got going, we were running really well, and Eros’s Strava kicked in with the pace and we realised that we were doing under 5 minutes per kilometer, which was definitely quicker than the pace we were planning to run – we had done 5.30/km consistently as a half marathon race pace. We were concentrating on using the metronome to determine our cadence … which was quite interesting in a crowded, congested race situation. Once we began running over the bridge and the noise died down, people started looking around, wondering what the noise was. But it was working well for us so we left it beeping. Then with our arms we were trying to put into practice what we had learned in our session: drawing our elbows back rather than swinging them across our bodies and trying as hard as possible not to punch each other! And the leg visualisations, lifting the knees up as if we were prancing along like dressage ponies in order to land on the mid-foot rather than the heel … and with all of those techniques combined we were absolutely flying along!’

Putting all of these techniques into practice is not easy and not ordinarily something that happens overnight. It was therefore no mean feat for Caz and Eros to be running so well. With the metronome guiding their cadence and the other techniques we had discussed in their minds, they were running far more quickly and efficiently than either had expected.

‘Apparently people back home were going crazy because the online tracker was predicting our finish time as 3.40,’ Caz continued. ‘It was only

when the different routes merged into busier roads that we were forced to slow down. The whole thing just became a lot more congested at that point and we had to concentrate on navigating through the crowded parts of the course … but we still had a really good run.'

'The other bit I remember,' added Eros, 'was in the last few miles – the sound of the crowds – I was getting tired but just focusing on the metronome and the pace gave me a benchmark to carry on.

'We finished in 4 hours and 13 minutes. I ran my fastest 10km, my fastest half marathon, and it was my personal best marathon time by 10 minutes.'

Bearing in mind that we had only started working together a week before the marathon, this was an incredible result and it was Eros's and Caz's willingness to embrace new concepts that really seemed to make a difference. Eros had achieved a personal best in a race that is not known as a fast course. Jumping in and trying to adjust their technique in a race situation was certainly a gamble but it was one that had ultimately paid off.

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Most runners have probably read the brilliant book *Born To Run* by Christopher McDougall. It's a seminal running read. For those who haven't yet had the pleasure, there has been a lot made of the minimalist running shoe movement that was born out of its pages, with many people after reading this book converting to a low-drop or no-drop thin-soled shoe or sandal in order to better replicate the barefoot running of our ancestors.

I am not going to advocate a particular type of shoe. I want this book to be about elasticity, not rubber. I have, however, done a lot of research on runners who have been wearing different types of trainers. Given that we have established how important the foot is, I think it is therefore important that we pause to explore how we are dressing it and, most importantly, whether that has an impact on how we run. One of the most eye-opening experiences that I have had in this regard took place on the side of a road in the beautiful coastal state of Goa.

Goa, India

Pem had grown up in the mountains and had a tall, chiselled body that made me truly believe that he was elastic. I knew this because all he was wearing was a pair of shorts. His feet were bare and hardened from years of direct contact with the ground. His legs looked like they'd been sculpted by an artist from ancient Greece – the muscles pronounced and bulging. He appeared almost Tarzan-like as he stood before us.

I was here at the invitation of ultra runner and all-round nice guy Dan Lawson. He'd invited me out to work with him on his own running but, when we spoke on the phone, he said that I should also meet his friend Pem. He said that Pem 'moved like water'.

With that description, I couldn't resist.

I got Pem to run up the roadside so that I could film him going past. When he did, he demonstrated a beautiful natural flow. His arms, which were driving him forwards, mirrored the long strides from his legs; he had a bow from his chest, which accentuated his tall, elastic gait; and he bounced high with lots of air, gaining him the time to land his bare foot perfectly underneath him with every soft step. It was a glorious sight to behold.

Next, as an experiment, we gave him a pair of running shoes and asked him to repeat his run.

He sat down on the sandy floor and laced them up. When I show people the footage of what followed – the two videos side by side, one of Pem running barefoot and the other in trainers – they almost, to the person, let out an audible gasp. It was a remarkable moment.

Pem ran up the road like he was a completely different person. He was heel striking. His leading leg was massively overstriding. His arms were no longer driving his momentum. He was leaning forwards slightly at the waist. He looked like someone who was out for a slow plod around the park. It was like we were filming a completely different runner.

You could immediately conclude from this that trainers are bad. That they are encouraging us to run in an unnatural way. That we should cast aside our shoes and run free.

I don't think it's quite as simple as that. I think that trainers can change our perception of our movement and affect proprioception and this is where we get ourselves into trouble.

If you are running without shoes, you can't heel strike. Your heel, which you will naturally land on when you walk, cannot take the impact of

running and so self-preservation dictates that we land elsewhere on the foot. That's the way we are wired. We are far more likely, as a result, to take shorter strides and we may even find ourselves adding more bounce because we feel so free. However, that also comes with some difficulties. Changing the way we run – particularly if we go from heel striking to landing on our forefoot with little to no protection from a pair of shoes – will put a tremendous strain on our lower leg muscles and tendons, particularly our calf and Achilles. Injury is a huge possibility at this point.

We therefore have to be sensible. If you want to change to a barefoot running style, it has to be very gradual. We have grown up with shoes on. It takes a minimum of four months for bones to remodel under new load, so transition is key. If you want to run well but not change to a minimalist running shoe, you have to change your perception of your movement so that the trainers do not dictate how you move but, instead, you do.

A few years ago, as the minimalist shoe revolution found itself competing with a maximalist shoe revolution and suddenly trainers with huge, soft, pillow-like soles came on to the market, I did some research. The idea behind a maximalist shoe is that it cushions our landing, reducing the amount of impact as we hit the ground. I put some movement sensors on runners so that we could measure the impact as they landed and then tested the difference between this impact when running in a neutral shoe against the levels of impact when running in a maximalist shoe. Amazingly, the runners consistently put a considerable amount more impact down when running in the maximalist shoes.

I think there were two reasons for this. First, if you put a runner in a pair of trainers that have a lot of cushioning, the runner's perception is that they are protected and they can hit the ground harder, which means they end up putting more force through their legs as they land. This is because they think they can. If you can feel your foot landing, you're much more likely to move in a way that is aimed at looking after yourself.

Second, we hit the ground harder in cushioned shoes because we have no idea that we are doing it. Our relationship with the ground is severely affected. The information from the complex interface that is our foot – which tells us about vibration, touch, feel and impact – isn't as reliable because of the large amounts of rubber between our feet and the ground. Our ability to move well is heavily influenced by our ability to feel our

movement. If you take a spiky ball and roll your bare foot over it, you will find that there is far more sensation on the forefoot and arch. The heel has very few nerve endings. This, and the fact that many of us wear trainers designed with extra rubber on the heel, tricks many runners into assuming that they land on their mid-foot (because the overwhelming sensory feedback is from the forefoot,) when in fact they are first touching the ground with their heel. That's why I would encourage anyone to video themselves running and also use the headphone technique that worked so well for Eros.

The best shock absorber is self-preservation. If you can feel your foot landing, you're much more likely to move in a way that will look after you. Our perception of our movement is a vital factor in how we actually move. If you go to work tomorrow and set to with only 50 per cent of the information you would normally get, you're going to start making some pretty rubbish decisions. If we mask the data that we can obtain from the ground by substantially blocking our interface with it, our body will also start to make bad decisions. The nerve endings on the bottom of the foot give us spacial awareness, perceived rate of exertion and tell us about contact, impact, touch and feel. We should be questioning how much rubber we want to put in between those amazing sensory organs and the ground they are trying to connect with. I'm not suggesting that you should go out and put yourself into minimalist trainers. I'm not even suggesting that you go and buy a new pair of trainers. What we should do, though, is ask ourselves how much rubber we really need between ourselves and the ground. It's a trade-off between proprioception and protection. We want to protect our feet from the elements but also allow those ingenious things to do their work.

More recently, as a big advocate of increasing our vertical oscillation, I have been asked to comment on new running shoe technology that claims to enhance the amount of spring that we create when we run. Once again, however, I believe that our trainers should be designed to allow us to move through our environment efficiently (i.e. grip for rocks and mud and protect our feet where necessary) but that they should not manipulate the foot or try to make up for our failure to take advantage of its ingenious benefits (which include stability, elasticity, dissipation of impact and proprioception). There is little point in having a shoe that claims to create extra spring in our step if

our interaction with the ground is not correct. In that case, we would never be taking advantage of the ‘spring’ anyway. And, what’s more, if our interaction with the ground is correct, I believe that evolution has given us all the natural spring that we need.

I am amazed at how much we runners obsess over gear. We are willing to spend hundreds of pounds and countless hours of research looking for a pair of shoes to solve something that will only ever be truly solved by an awareness of how we run and what is causing the issue through our movement. It’s madness. And don’t get me wrong. Remember, I bought the £25 pair of socks that said they’d make me bounce. I have been there. If maximalist shoes were around then, I’d have been all over them, bouncing around and hoping that a lot of cushioning would protect my painful knees. But I now know that I’d have been masking the problem and maybe even making it worse. We cannot buy our way out of trouble. There isn’t a pair of trainers in the world that I think enhances performance. They all to a degree inhibit it – it’s just about how much. What we should be investing in is good, efficient movement. And, if we get it right, this can truly enhance our performance. What’s more, it’s completely free.

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Problems with our feet that are caused by how we are landing can end a race or make it unbearable. I have seen runners turn up constantly struggling with blisters and yet, with some coaching and by changing the way they move, they have gone on to run multi-day races with no foot problems. Katie Baker is one such athlete. For her story, we have to go north, back to the freezing depths of Arctic Sweden.

Arctic Sweden

‘Over the last 10 years I took up running on several occasions. I enjoyed it and managed a marathon, but after about 20 minutes would always end up with blisters on the balls of my feet. I tried custom-made orthotics, pre-taping and transitioning from a heel to forefoot strike but the problem never went away, so each time I would give up. In 2015, I eventually decided to

complete my dream of running the Marathon des Sables, which I did in April 2017.

‘Although I finished in a respectable time it was an agonising experience and I had to have strong painkillers and antibiotics just to get through. I overcompensated so much that afterwards I ended up on crutches with a suspected stress fracture in my foot. To make matters worse, in my excitement prior to the race I had entered the Ice Ultra – a 230km race in Arctic Sweden for the following February – which I was very concerned about. I decided that it was time to get help.’

Katie Baker came to see me to investigate whether I could get to the bottom of the issues she was having with her feet. From watching her running, it didn’t take long for me to spot that Katie needed to improve her foot placement and move with a running rather than a walking gait. Rather than land on either her forefoot or her heel with her leg striding out in front of her hips, we worked on Katie adding height to her stride in order to allow her the time to bring her leg back underneath her body and execute a full-foot landing directly under her hips. This would provide greater proprioception, more stability and reduce the impact on her knees, hips and back. It also meant that she wouldn’t create the same hot spots on the balls of her feet that had been causing her so many problems. This new technique appeared to help and Katie’s preparations took her into the race, which I attended as a researcher and as part of the crew.

‘After seven months of practising these new techniques, I was terrified,’ Katie admitted. ‘This was an unfamiliar environment where frostbite was a real possibility and I was uncertain how the soles of my feet would react to running in deep snow with snow shoes and spikes, particularly as I was carrying a backpack that weighed more than 20 per cent of my bodyweight.’

Day one of the race was a 60km journey through spectacular landscapes consisting of frozen lakes and pristine forests. The temperature was well below -20°C and the snow was exhausting for the competitors to move through. Maintaining good technique was extremely difficult yet it would prove to be crucial to Katie’s success.

‘After a couple of miles I was a sweaty mess and felt wrecked,’ she told me. ‘If I’d carried on like this, I would have ended up with serious cramps later, and would have got very cold as soon as I slowed. Trying to calm

myself, I took a mental check about my running technique. The unfamiliar environment and snowshoes had caused me to slip into previous bad habits – in particular, I was overstriding and looking down at the floor. Shortening my stride, looking up and taking short but regular walking breaks, I soon found myself in a sustainable rhythm. It felt strangely meditative. I stopped noticing the backpack I was carrying, or the fact it was well below freezing. I was moving at a pace that was keeping me comfortably warm.'

It was quite horrifying to see several competitors with frostbitten toes and terrible blisters. All competitors were warned that the temperature was plummeting and that they needed to take particular care of hands and feet but many had succumbed to the conditions and had not looked after their feet. Thankfully for Katie, she was not one of them.

'Every subsequent day the temperatures dropped further and by day four it was -37°C. This posed additional challenges, such as ski goggles freezing over and having to make decisions about whether to expose my face to the cold or walk blindly off track – neither of which were ideal options. It was magnificent but brutal, much harder than my previous race in the desert, and I spent almost the entire time on my own climbing mountains, traversing miles and miles of frozen lakes and admiring the northern lights in the endless hours of darkness. The pace became very natural and hours passed by in a haze.'

After five long days and 230km of snow, Katie finally reached the official finish line in Jokkmokk. She finished as first lady – an incredible achievement and one that she was quite rightly very proud of.

'It was the hardest race I had ever done but I was physically and mentally in a much better place. My back and shoulders were nowhere near as sore, which I attributed to looking up and admiring the landscape rather than constantly looking at the floor, and, more importantly, my legs felt OK as I had been moving naturally – rather than overstriding – and had therefore not been overstressing any of my joints. Best of all, there was not a blister in sight.'

For someone who had, only months before and even in the best running conditions, been blighted by blisters, this was a wonderful outcome.

All of this only went to reinforce the importance of getting our foot placement right. If we can land effectively with a tripod landing then we can overcome myriad issues and injuries caused by our running form. Not

only will that tripod landing ensure better balance and symmetry in our body when we are moving but it will also ensure that our feet – those vital proprioceptors that are responsible for managing our only contact with the ground when we are running – are capable of ensuring an efficient and elastic end to our running chain each time that we land and a dynamic and propulsive motion each time we push off.

CADENCE

Let’s talk about steps.

In basic terms, cadence is a measure of how many steps you take per minute, counting both feet. It’s one of the most commonly measured running metrics and the one runners love to discuss the most. Read any article on running cadence and it’s likely to tell you that 180 steps per minute is the holy grail. Most articles don’t really tell you why – I’m not sure that anyone even remembers why – but it’s deeply ingrained in running lore.

I believe – from working with and analysing more than 3000 runners and indigenous people – that the reason is linked to our fascial system. Our optimum cadence is somewhere between 175 and 185 steps per minute because this is the frequency at which our species moves when we want to join in with the creation, store and release of elastic energy. If we move at a lower cadence, there is a good possibility that a lot of this energy will be lost. As James Earls put it when I discussed this with him: ‘The way in which we land is designed to maximise the elastic energy by optimising the energy captured and ensuring it is efficiently returned to our system by using a 180 cadence. If the energy is held for too long in the fascia it begins to dissipate and is lost to us, a process called hysteresis. Turnover of the stride is therefore equally important if we wish to be “elastic runners”.’

We have already seen with Tom Evans that there are great benefits to be had if we optimise our cadence. One of the athletes with whom I have worked closely on this is triathlete Kerry Hickson. She came to see me in order to work on her running form – something that many triathletes ignore. We join her in the sweltering heat of the Persian Gulf.

Bahrain

‘That moment. That ghastly moment of having absolutely nothing left during the run leg of a triathlon. You’ve known all along that the carnage was coming and yet, despite being fit and absolutely “bining” yourself in training, nothing can quite prepare you for the moment that the death marching starts. You’re fuelled, you’re in the form of your life, but at some point on the run you’re going to feel like you’ve got nothing. Totally broken. Like you’re trying to move through treacle with an open parachute on your back.’

For those who are not in the know, an ironman 70.3, or half-distance triathlon, consists of a 1.9km swim, 90km bike ride and then a half marathon distance (21km) run. A full-distance triathlon, or ironman, is double: you swim 3.8km, bike 180km and run a marathon (42km). Kerry had enough experience to talk me through the ‘carnage’ in either case.

‘So, you’ve survived the swim. You’ve dug deep to get through the bike, mentally and physically, because you’re pushing hard for 90 or 180km and that’s a long time to maintain pain and concentration regardless of how fast you can cycle. You’ve even managed to nurse your legs through those initial excruciating steps when you first transition from cycling to running and managed to get into a good running rhythm. Ironically, trying not to run too fast, so it’s not so spectacularly awful when you get to the death march. You might even be having a great day and get to the final stretch of the run before your legs depart you. Something like 15km out of 21km run for a middle-distance triathlon, or three-quarters of the way through the marathon for a full-distance triathlon. But at some point your legs *are* going to leave you, you *are* going to feel like you have absolutely nothing, and the death marching *will* commence.’

This is where technique pays dividends. Not just when you feel that you have nothing left but before that. If you run efficiently from the start, you are going to stave off the death march for far longer. That’s something that Kerry thankfully came to realise.

‘Pacing can help, as can not burning through all of your matches on the bike, and keeping on top of nutrition and hydration. As well as training really hard. And improving bike strength. But, for me, a big breakthrough in enduring demolished legs and a fraught mind during the triathlon run has

come from having an array of techniques in my armoury. It helps to quiet my mind and maintain my running form. Both of which are invaluable when all I want to do is curl up into the foetal position, start shuffling and move at a snail's pace.'

Rather than a snail, though, this was an approach that I liked to refer to as running like a 'slug'. It was a phrase that stuck in Kerry's mind as we worked together on her cadence and, importantly, on ensuring that, at all times – even when the carnage took hold – she was running rather than shuffling her way to the finish.

'Instead of hunching over, tensing up, shortening my stride so that I barely moved my legs – like a "slug" – and hanging on to the bitter end, I started to aim to keep my cadence at 180 steps per minute, to ensure that I was still striding and running. Not only did this help maintain a decent pace, but it also enabled me to block out all of the end-of-race grimness as a result of the tiredness I felt after racing for four or nine hours (depending on the distance). Instead of listening to my mind screaming at me to slow down and make it stop, I just focused on my cadence, and how I needed to open my stride in order to maintain that cadence, and nothing else.'

For most people, these techniques are not perfected overnight. It takes a lot of time and dedication for them to become our default, particularly when we are changing our cadence and therefore the rhythm that we have become used to running at. Kerry was no different, but fully dedicated herself to improving during her training.

'It's something I practise diligently so it comes more easily on race day. And I have been working on it for a long time. But, finally, it's enabling me to get to the glorious finishing chute without nearly as much drama. It still gets ugly – very ugly – and hurts like hell, but the best anaesthetic is when it keeps you in the race and running. In Ironman 70.3 Bahrain, I blew my legs off on the bike, found it hard to settle at the start of the run, even worse than usual (I was running through treacle with the open parachute and seeing stars), but somehow I managed to keep my cadence and form, get through the death march, and win.'

Kerry was already a hugely talented athlete, but she really put the work in when it came to her running. Thankfully, as a result, she has reaped the rewards.

‘I’m still not a fast runner but, as they say – winning a long-distance triathlon is about who slows down the least, not who runs the fastest. Adopting these technical cadence prompts definitely helps prevent me from slowing down. And I no longer look like a “slug” – so it’s a WIN WIN!’

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Most of the runners who come to see me for coaching are running at a cadence of between 160 and 170 steps per minute (for those interested, the average of all of the runners I have monitored is 164). When they attempt to change this, most find it very challenging to run at a higher cadence and that is linked to a common misconception that I admittedly made myself in my early days of coaching: that cadence is the answer to all of our running form concerns. That if we get that bit right, the rest will follow.

I can understand the logic. If you take a heel striker or someone who is overstriding and get them running at a higher cadence, then chances are that you will shorten their stride length and get the foot landing underneath the body, thus largely (at least in most people) eradicating the heel striking. Surely, then, you have fixed the biggest visible issue and the problem is solved?

Well, sadly not.

You see, to isolate this part of the running chain – which is actually the end rather than the beginning – you are treating your landing as the most important part of your form. It isn’t. Your body should naturally land your feet in a correct fashion and at a natural cadence if you get the rest of your body working with you. And chances are that by focusing on cadence, the runner in question is not changing much else and is therefore now shuffling around with quick feet, a shorter stride and, most importantly, very little by way of vertical oscillation. They are therefore now completely sucked to the ground, far less dynamic and most likely struggling with their breathing.

The big lesson is that cadence is only one part of the equation. There isn’t much point going to a 180 cadence if you are being sucked to the ground in an energetic walk. What we therefore need to understand is the relationship between our cadence and the rest of our movement. That way, we can truly join in with our elastic system.

Those people I have analysed who move incredibly well – who are able to optimise the elasticity in their body and move like I believe our species is intended to move – have all moved at a cadence of between 175 and 185.

The second time I went to the Amazon jungle, there were two local Peruvian farmers racing. We gave them packs and I put some movement sensors on them and they set off for five days with the rest of the group. Well, I say 'with' them. They were out of sight of the rest of the runners for the entire race. These guys came first and second, beating the best European runners who had entered by some distance. So, I was fascinated to find out from my discussions with the winner that neither of these Peruvians were runners at all. They worked physically intensive days for a living and so didn't wake up in the morning thinking 'I'd better go and do 10km before I plough that field'. It just didn't happen. They had only turned up because there was a cash prize for Peruvian runners and they thought they would take their chances.

What was more fascinating still was that the winning runner covered 60km through the jungle and averaged a cadence of between 175 and 185. He was moving at what I believe to be our species' natural frequency. He moved this way because that was his natural rhythm and, I suspect, because he had not suffered the negative nurture that so many of us have faced. However, the important take-home message was that it wasn't just his cadence that stood out. He ran beautifully tall and with fluidity and used his arms to propel himself forwards. He moved with incredible elasticity, like so many of the African runners whom I had analysed. It was this complete package – and not just his cadence – that produced his beautiful movement.

This brings us back to where we started. It is not possible to take just one of the techniques outlined in this book and fix all of your running woes. Cadence is hugely important but – as demonstrated by my Peruvian friend – it's when you combine it with dynamic and elastic movement that it becomes a potent weapon. That includes the amount of height you are achieving in your stride and also – and we are going on to consider this next – the actual length of the strides that you are taking.

STRIDE LENGTH

It seems counter-intuitive. Most runners need to increase their cadence and lengthen – or at least maintain – their current stride length. For the majority, when they first encounter this, they resolve that they can do one or the other but not both. That's because their perception of their movement – and, in most cases, how they are used to moving – is locked into a style that has them lunging their leg forwards in front of them in order to stride out.

So often I hear that, to be efficient, we need to stay close to the ground so that we don't waste energy or create too much impact. As we have seen, this biomechanics-led view is creating generations of runners who are scared of the ground and have no choice but to overstride and heel strike because there's no space for their legs to turn over underneath them.

It's all connected. If we tend to overstride, we will find it extremely difficult to increase our cadence without dramatically shortening our stride length and then even if we manage to increase our cadence, we will pitter-patter our way to an energetic walk that has us sucked to the ground even more.

We need to change that perception.

Imagine a runner who is landing their foot out in front of them. They are landing on a heel and, in order to reach forwards with their leg and create a long stride, often bending forwards at the waist. Now imagine it in slow motion. The runner makes contact with the ground, their foot striking the heel then flattening as their whole bodyweight moves over the leg, loading partly in front of them and then underneath them. Because they hit a hard stop on landing, their leg often collapses at the knee and they sag at the hips (because they are leaning forwards at the waist) before they eventually bring their leg back and most likely have to push off from their toes. At this point their other leg leaves the ground. Their perception of the foot landing

in front of them, going all the way underneath them and then pushing off from behind makes them feel like they've got a really long stride but, in truth, they have had to go through a huge amount of work to achieve it. (See here.)

Now imagine a runner who is upright, their body bowing from their chest. They are lifting their knee in a cycling motion and landing their foot on a soft knee underneath them with a tripod landing, loading and then pushing off using an upwards and forwards curved trajectory. Because they are cycling, their other leg is already on the way back as the leading leg leaves the ground. It looks effortless. There are fewer processes. They spend less time on the ground. Their whole body remains tall and strong. They have stability from their foot. All in all, it's far more fluid. (See here.)

This is where perception is fascinating. In the latter example, the runner is not visibly accentuating their stride length. In terms of their body, their leg does not reach anywhere near as far forwards. However, provided that the second runner gets height that takes them upwards and forwards, they are likely to have the longer stride.

That's why I've been talking about the importance of getting some 'air'. In my experience, the key to unlocking the cadence/stride length conundrum is increasing the height – or 'bounce' – in your run. As we have seen with Pavel, getting this height when you run is not the negative that so many paint it to be. Vertical oscillation is probably the most misunderstood and misused of all of the measured running dynamics.

On my travels I have seen runners with incredible elasticity displaying high vertical oscillation, a long stride length, low ground contact time and a cadence of around 180 steps per minute. That combination is a challenge to achieve and somewhere along the way we have demonised bounce and removed it from the equation in favour of cadence. As a result, coaches and some physios are teaching running as a mechanical rather than dynamic movement, with a huge focus on achieving a 180 cadence without then considering other factors.

We should see height in our stride as a beautiful thing – a gift and a skill that allows us to move dynamically. Some of the elite Africans I have analysed have a vertical oscillation of 15cm. Of course, all things are relative but we should not see bounce in our stride as a negative. The secret is to create bounce that takes us upwards and *forwards*. If we are moving

forwards through the air and cycling our legs underneath us as we go, we will land further forwards than we would have but with our foot making contact underneath our body. Height essentially gives us room to work.

As an example of this, I once again turn to Mark Denby. After our meeting in the Amazon jungle, Mark and I worked together on his running form – including creating more bounce in his stride – just before he embarked on another extreme challenge, this time taking on the Spine Fusion. We join him in the middle of the action.

The Pennine Way, England

'I woke in a panic. I was refreshed from the sleep but shivering uncontrollably. It felt like the cold had permeated every layer of my being – through my clothing, my skin, my muscles, my flesh – and eventually set deep within my bones. I was covered in tick bites. My skin, itchy and irritated from their unwelcome attention, was now the only thing that burned hot under the scant layers of running clothes that I'd lain down in. I had no idea how long I'd been asleep.'

Before he closed his eyes, Mark had been 44 hours into the non-stop seven-day, 268-mile race from Edale to Kirk Yetholm along one of Britain's most iconic National Trails, the Pennine Way. This was the summer version of the legendary Spine Race that we encountered with Pavel.

Up until this point, the race had been going so well for Mark.

'The first 108 miles had gone as expected. I'd raced these the year before on the Spine Challenger (a short version of The Spine in winter), so I knew them well. I was only eight minutes down on my time from that event and it was now considerably hotter during the day. I'd slept for only one hour out of the first 24. I knew that sleeping had to be part of the race strategy and, while normally I'm big on planning, I also knew that I had to be prepared to change the plan. When I finally got to Tan Hill checkpoint, the heat was exhausting. I made the decision that I would try to eat and then sleep for two hours to see out the hottest part of the day and then I could make the most of the cooler night. It was still energy-sappingly warm when I left and, by the time night fell, I was struggling to keep my eyes open as I passed above the deep, brooding chasm of High Cup Nick.'

At the end of the second night, Mark had pushed on through Middleton and had a frustrating time as he climbed High Force and covered the miles of rock-laden beach surrounding it, which massively slowed his progress.

‘I remembered Joss Naylor [the legendary Lake District fell runner, who had previously held the Pennine Way record] talking about Nicky Spinks’ double Bob Graham Round,’ Mark recalled. ‘He said that it’s always dawn of the second day that’s the hardest. That’s where I had been when I decided to close my eyes. Ahead of me were the biggest climbs of the race course – Knock Fell, Great Dun Fell, Little Dun Fell and Cross Fell. I couldn’t keep my eyes open for a moment longer. I didn’t even take out my bivvy bag as I lay down on the cold, damp ground.

‘Once I was fully awake, I swallowed hard as panic took over. I had been leading the race. A race that I wanted to win. I imagined the hordes of runners who must have passed my dormant body, sneaking joyfully ahead of me as I slept. How far behind was I? Had I just blown my chances?

‘I checked my watch and then double-checked the time on my phone.

‘I’d been asleep for a total of four minutes.’

With that welcome realisation, Mark hauled himself to his feet with a renewed enthusiasm and moved along the trail.

If the dark had sucked his energy, there was a lot to be said for the restorative properties of light. Mark had the most amazing morning enjoying his body’s natural elasticity in full flow.

‘I hit the flagstones and put some music on,’ he remembered. ‘Something fast to keep my cadence high – and I bounced my way over those fells. It felt amazing. From that point on sleep was still an issue but I kept going because I felt so good. Hadrian’s Wall went well with lots of bouncing required through the gaps. I now knew that the way I moved and the way I kept moving was absolutely key.

‘I remembered crewing Tom Garrod when he was running the length of Ireland. He had lots of psychological issues and sleep issues, as you do on these challenges, but the thing that amazed me about Tom was that he just moved beautifully throughout. It taught me that moving well is vital. Standing still, your average speed plummets. If you can manage to walk, you can stabilise things. If you can jog, you can go almost twice the speed and if you can manage the basics of a run, then you are making real progress.

‘Sleep was now measured in minutes, grabbing five or so here and there across the Cheviots. My plan – which was a year in the making – had me finishing in around 72 hours. The Pennine Way record is 65 hours. Joss Naylor’s was 76 and I really wanted to at least hit that. In the end, the heat got the better of me and I came in around 78 hours in first place. I’d slept for three-and-a-half hours in total. The next runner was 13 hours behind me but I didn’t consider that to be far. Until it’s over, you don’t know how much energy they have and where they are in their sleep. You don’t know when you are going to hit a bad patch. You can’t take anything for granted until you reach the wall of the Border Hotel in Kirk Yetholm and can stop moving.’

Mark’s love for long distances really started in 2012 when he took three months off work. He was a keen walker and found that the Long Distance Walkers Association (LDWA) did a 100-mile walk each year. He joined them in the year of the London Olympics. Despite apparently nearly killing him, he was then completely hooked on the 100-mile distance. The only way he could think that it could hurt less, however, was to do it more quickly. In the following year, he ran the LDWA’s 100-mile walk and then did the Lakeland 100 (a 100-mile race in the English Lake District). It was about this time that he also read about The Spine. Having grown up in the Pennines, he knew what an extreme event this was and what the weather would be like in January. To Mark, it just seemed ridiculous. However, he found himself thinking more and more about it and, while his conscious mind continued to tut at the very idea of something so absurd, his subconscious mind was already filling in the entry form and planning how he could do it.

As a first step, he did the Spine Challenger in January 2015 and came fifth. Then he heard about a race that I organised called the T184, a 184-mile challenge along the River Thames in south-east England. He decided that this would be perfect preparation for The Spine.

‘Two hundred and sixty-eight miles would be a big step up from the 100-milers I was used to,’ he remembered, ‘so 184 miles felt like a good distance to progress to. I wanted to practise with kit and I wanted to win the T184 prize, which was a place at the Jungle Ultra in Peru. I did win and I therefore got the entry to the Jungle Ultra.’

As we have already seen, I was out in Peru with Mark and, throughout the trip, I kept saying that I would love to work with him on his running technique. When we returned, he got in touch to make this happen.

‘I always knew that I needed to be efficient in my movement in order to do what I wanted to do. I also knew that to be efficient, I needed to have good form. The problem was, I didn’t know what “good” was.’

‘I was forefoot striking and dealing with it but, when I ran T184, I absolutely smashed my lower legs because of all the pressure on my calves. They probably took a full year to recover. I was destroying my trainers in less than 100 miles due to the way I was landing. I tried orthotics and then had started to run in minimalist shoes. Nothing really helped.’

Within one or two sessions, we got Mark running upright and transferring all the strain from his beautifully formed calves to his completely underdeveloped glutes and quads, which is where the action was meant to be. During the course of our work together, we changed the way he was running. Then we were able to work on more specific techniques, such as ascending, which would serve him well for the challenges ahead.

‘Running up hills is one of the biggest benefits. I think of it as bouncing. The game changer for me was maintaining my cadence but reducing my stride length when I was finding it too hard. At times, it feels like you are almost not moving up the hill but you are using the elastic recoil in your legs to bounce all the way up the ascent. After some practice, I discovered that it was now easier for me to run up a hill than it was to fast walk it. This made a huge difference during the Spine Fusion.’

We also focused on Mark’s perception of his movement, convincing him that he needed to imagine the elasticity in his body in order to accentuate it and accomplish an efficient and dynamic stride. Mark truly embraced this.

‘My perception was that I was using that elasticity in my body. On the Pennine Way you have long sections of flagstones, which in the winter are frozen solid, but you are running on an incredibly hard surface. Back when I did the T184 race, when I was landing, the impact was going up through my knees, but if you become bouncy all of a sudden running on a hard surface is brilliant because you get that recoil from the ground. The difference on the Spine Fusion versus the Challenger was that they were a joy to run over and it was disappointing to reach the next boggy section, where I lost that hard surface. I always visualise a hard rubber ball that

bounces tremendously on a hard surface. My goal was to get my body to do that and to harness that energy. The energy from the ball propels it back up again. What you don't want to do is run with a saggy shock-absorbing body – you don't want to absorb all that energy, you want to rebound from it and reuse it.'

This was a great visual tool for Mark to use when adjusting his perception of his own movement. Putting this into perspective, even in the last few miles of the Spine Fusion, Mark told me that he was enjoying it! He was not just running with his legs but with his whole body. He had gone from a try hard runner to someone who had realised that running was a skill and that a good technique would always win over pure hard effort.

'Many years ago I used to swim on a regular basis. I wasn't very good at it but I did it for exercise. One time an elderly gentleman stopped me at the side of the pool and said he used to be a swimming coach. He said: "You know your style is absolutely shocking but the speed you manage is incredible. If you could put in that much effort and direct it into going in a straight line, you'd be brilliant." I always look to apply that to my running now. I recognise that the reason I was doing well in races was sheer effort and what I have got now is efficiency. Squeezing out 5 per cent more efficiency from that effort could be huge. I believe running is about perception of effort and we only go as fast as we believe is possible. It is our limiting factor so, if we can get that effort down, our speed and distance will go up. I do think of my running as my engine and my transmission gear. My engine has always been pretty good but my transmission gear has been pretty shocking and if I turned my engine on full, I was likely to blow the wheels off. That's why I needed to be more efficient.

'What I've noticed about moving properly is that my recovery is so much quicker. When I ran T184 I was wiped out for six months and was still suffering in some respects when I went to the jungle 18 months later. Whereas, for the Spine Fusion, I recovered really quickly with just a few minor niggles where muscles were underdeveloped.'

'It's a process and I don't think it will ever be over. I hope I never get to the point where I think: "That's it. That's as fast as I can go."'

Working with Mark and particularly focusing on his stride length in different scenarios, including when he was ascending, further reinforced my theory that technique will always win over pure effort. That's not to say that

he didn’t put in the effort – clearly, there is much of it required to win a race like the Spine Fusion – but it creates less of a need for huffing and puffing around a course. Many of us are fighting against our own poor running technique and having to massively compensate for our inefficiencies through effort. Mark was always a good runner but, with the techniques that he worked so hard to incorporate into his gait, he chose efficiency over hard grit and became an exceptional one.

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Our perception of our movement has a clear influence on the way we actually move. When I travelled to Africa to analyse runners there, it always struck me how long their legs were. Yet over time I have come to realise that this was also about perception. If I were to ask you where the top of your leg is, for example, I imagine that you would point to a bone. Most likely, it would be the top of your femur, where it joins your hip. This makes sense. We have grown up with a mindset that is heavily influenced by biomechanics and the anatomy of parts. We see our bones as the structure from which everything else is attached and so, naturally, we define our legs by the bones that we recognise as belonging to them.

However, if we consider this same question from a biotensegrity perspective – considering that our bones are suspended in a sea of tension rather than a stabilising structure – we would actually say that our leg ends at the T12 vertebra, which is just below the ribcage and above the small of our back. That’s also where our psoas emanates from – which I consider to be our running muscle. (See illustration of good running form here.) If you are moving naturally through the lines of fascia that run up your body, your legs will hinge here. That makes them – and your stride length – appear far longer than the definition around the bones that we traditionally label as our legs.

If we change our perception of where our leg ends, it allows us to get into that tall posture, slightly bowing our upper body in order to truly accentuate our stride. If we do this, we will increase our cadence, maintain or lengthen our stride and reduce our ground contact time. All things that make us better and more efficient runners.

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In order to achieve a higher cadence, we must quicken our turnover. As we have seen, if we do that without adjusting anything else, it will shorten our stride length and suck us to the ground in an energetic walk. By gaining height in our stride with an upwards and forwards curved trajectory (which, as we have seen, is a counterbalance to that energetic walk), one of our goals should also be to reduce our ground contact time (how long our foot spends on the ground, generally measured in milliseconds). If you think about it, while the time you spend on the ground is the crucial opportunity to land and rebound, spending too much time in that process will increase the amount of deceleration you encounter and the hard work you have to do in order to recover momentum as a result. I have measured elite African runners with a ground contact time of less than 150 milliseconds and beginners in excess of 320. There is no one-size-fits-all. What you will find is that as your foot contact becomes more efficient, your time on the ground should reduce. A foot contact that lands on a tripod creating instant stability and is on its way back underneath you as it lands (so that it pushes off while still under your centre of gravity) will dramatically reduce your time on the ground.

Journalist Adharanand Finn knows Kenyan running better than most. He lived in Iten with his family for six months, eating, sleeping and drinking their way of life. Much like myself, he went out to study and learn what made the runners there such exceptional athletes. So when I got the chance to work with him on his own running form, it was not only an honour but also an opportunity to share ideas with someone who truly understood where I was coming from.

We first met when I was giving a talk to the British 24-hour running squad on a training weekend in Berkshire, with Adharanand joining as a fellow guest speaker. When we got the chance to sit down for a chat, it became immediately apparent how similar our journeys had been to get there.

‘We had both become students of the world of running,’ Adharanand recalled, ‘but while I returned from places like Kenya and Japan to tell the stories of the way the runners in those places lived, how they thought, how they trained, what I had not studied more closely is how they ran.’

That’s where our journeys collided because most of my focus was going on just that. I was delving deep below the surface, returning each time with more and more pieces of the puzzle that I hoped would lead me to discover what I felt had become a lost art to most of us.

Adharanand was impressed by the length and breadth of my research. ‘But I’m reassured,’ he continued, ‘that it usually comes back, as do most things I find to be true and right in running, to the Kenyans. Those guys just know what they’re doing. It’s instinctive, not learned.’

We finally managed to arrange a technique session for Adharanand a few weeks before he was due to run the Kingston Marathon in Jamaica.

‘I’d been running ultramarathons for the previous two years, so my stride had got a little sluggish,’ he admitted.

I spotted the reason for this very quickly as Adharanand ran around the park in front of me.

‘My posture was good, my foot strike was good (I had, after all, been working on my form),’ he recalled, ‘but my feet hung around on the ground that fraction too long, losing energy, losing momentum. If I could lift them quicker – giving me a shorter contact time – I’d be making better use of that free elastic energy that the Kenyans harness so expertly.’

I gave Adharanand some tips for reducing his ground contact time by getting his legs cycling beneath him, gaining a little more height in his stride and quickening his turnover.

‘I tried it around the running track in Regent’s Park in London. It felt strange at first. The body doesn’t like change. But it didn’t take long. A few laps later we watched the slow-motion footage of my stride again.’

‘You’ve got it,’ I shouted. ‘Much better.’

‘I went around again, practising it,’ Adharanand recalled. ‘And by the time I was jogging home an hour later, I was running easier, but faster, both at the same time. The free bounce in my stride pushed me along effortlessly.

‘The real test was how it worked in a race, and heading out on my second lap in Kingston, as the sun began to rise over the top of the Blue Mountains, things in marathon-land were starting to get tough. Everything ached as I tried to push on. I remembered the session. “Pick up the legs, feel yourself rising with each step, upwards and forwards,” I told myself. Suddenly I was speeding up again, reeling people back in. It worked. Until I forgot, and

slipped back into my slow, sorrowful trudge. Then I remembered: “Pick up the legs.” I was going again.’

‘That was just a few weeks after our session, but once I get it fully, and I get to run a marathon somewhere a little cooler, and with fewer hills, I’m hopeful that, finally, I may be able to run a whole marathon like a Kenyan. That’s the dream.’

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Chamonix, France

As well as optimising our stride length, we also need to be mindful of creating balance in our stride. While most of us are not even aware that we have an issue with this, it was during another trip to the mountains that I realised it is something that nearly all of us are struggling with.

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I couldn’t watch. She was heading towards me at a hurtling pace. I presumed that she must have lost control at some point before she crested the steep rise above and was now shuttling towards me at a frightening rate of knots, out of control and seemingly out of options.

I was waiting for the inevitable crash. The moment when she would flip over and roll into a mangled pile of limbs at my feet.

She shot past me and let out a spontaneous whoop. It wasn’t fear, though, it was a cry of sheer and utter joy. She was perfectly in control. In fact, she was having some serious fun!

Mimmi Kotka is a Swedish ultra runner famed for winning the CCC and TDS, both tough UTMB races. I was in Chamonix, her current home, and was lucky enough to spend some time with her in the mountains.

I’d never seen anything like it. I had to tap the sensors and ask her to go again. As you would expect, most people create more impact when they are descending than they would on the flat but Mimmi was the exception. The way she descended was so measured – despite appearing a little out of control – that she created no noticeable increase in impact. In fact, she seemed to create less. That is, in my mind, a phenomenon.

However, the session also brought something out that I have been able to study in many runners since. As she descended, I realised that her legs were perfectly in balance. There was no noticeable difference in impact between one leg and the other and no dominant leg that took the brunt of her jumping over oncoming obstacles.

Let me explain. In terms of our legs, most of us have a stabiliser and a prober. For example, if we kick a ball with our right foot, we will stabilise with our left. Our perception may be that our right leg, which is taking on the job of striking the ball, is therefore our dominant leg. In actual fact, it's the left leg that is dominant. It takes all of our weight and stabilises our whole body in order to allow our right leg to be free. When I discussed this with Damian Hall, who played a lot of football in his youth and was thankfully, at the time of our discussion, wearing shorts, you could clearly see the difference just by the definition of his quads.

Equally, when we run, we tend to stabilise (with the equivalent of that non-kicking leg) and lead (with the equivalent of the kicking leg). This is accentuated when running downhill. The next time you are out for a run, think about it. If you have to jump over a puddle or tree stump, take a mental note of which leg you use to stabilise (i.e. to push off from) and which leads.

If we always stabilise with the same leg, which most of us do, we will move in a slightly strange way. If we are constantly approaching obstacles on the trail and having to change our stride to make sure that we push off from that particular leg, then we are constantly adjusting and hesitating. Our muscles also tire and injure far more easily if we misuse or overuse them. If we are giving one leg a job of stabilising (pressure) and one of leading (more likely to land on a straight leg), then both are consistently taking a load that isn't ideal. However, if we get more balance and symmetry – a nice equilibrium rather than having a constant prober and a constant stabiliser – it spreads the load and gives us confidence to keep turning our legs over without hesitation, no matter what the terrain. With Mimmi, there was no stabiliser and prober. Whichever leg got to the obstacle first took the lead. If you are tackling a race such as the UTMB, for example, where there is a constant need to run up to and jump over or around things on the trail, having this balance and symmetry is going to be hugely advantageous.

The best solution is therefore to be more like Mimmi – try to mix and match to take the load off one leg and ensure that there is, as much as possible, an equal balance in the heavy lifting being done by each limb.

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So, in summary, don't be fooled into thinking that you need to stride forwards in order to increase your stride length and don't get caught up in the idea that increased cadence inevitably equals shorter strides. Instead, remember that you increase your stride length and cadence not by taking smaller steps but by getting more height in your run and by spending less time on the ground. If you simply increase your cadence without this extra dynamic movement, you will be staying on the ground for just as long as before but hitting it more times. As a result, you will immediately feel like you're pitter-pattering and you'll be sucked down to the ground. The key is to gain some height in order to cycle your legs beneath you. This extra room to move will allow you to land further through your running cycle, meaning you'll spend less time on the ground (reducing your ground contact time) and, importantly, not shortening your stride.

POSTURE

Posture is absolutely key to natural elastic movement. You may remember that when I asked former marathon world record holder Wilson Kipsang how he runs, one of the factors he identified was ‘running tall’.

Utilising our fascial system will allow us to create elastic recoil and elastic energy, taking work away from our muscles and tapping into our body’s natural energy source. Think again of giant elastic bands running up from your toes to the top of your skull. If you run hunched forwards with your head down, the elastic bands will be loose and there will be very little recoil, meaning the muscles will have to do all of the work. Muscles tire and need fuel and so the more help you can give them the better. If you run upright and tall, you will pull those elastic bands tight, creating a natural recoil that provides energy and propels your muscles. The great thing is that the ‘elastic bands’ don’t need fuel and they don’t tire. If you want to move efficiently and effectively, you need to make use of this natural elasticity.

There is no better example of this than the work that I have done with Elisabet Barnes. Elisabet should need no introduction. She is a successful ultra-endurance runner, a two-times winner of Marathon des Sables, a coach and motivational speaker with an enviable record of success. Going into the Marathon des Sables in 2017, we worked specifically on Elisabet’s posture, ensuring that her perception of her movement was that of a graceful figurehead on the bow of a ship. I messaged her over the MdS messaging system every evening to reinforce this – simply writing the word ‘figurehead’ each time. Elisabet implemented this brilliantly. She ensured that she was always moving in that beautiful, open, dynamic position that we had wanted her to visualise. Having said that, with the competition that lined up next to her at the race, that still didn’t mean it was easy.

Marathon des Sables, Morocco

“She’s about 16 minutes ahead of you.”

‘My heart sank. It was as if my whole body crumbled.

‘“Thank you,” I mumbled as I passed the two competitors who had just conveyed that nugget of information that I really didn’t want to hear.’

It was late afternoon and the sun was beginning to set. It was the long stage of the gruelling Marathon des Sables and Elisabet had been going since 11 a.m. in mostly soft sand. It was over 40°C. She was beginning to tire.

This stage was on the fourth day of the race, when competitors had already done 35–40km daily for three consecutive days, carrying a pack containing all of their gear and food for the entire week, sleeping in open tents with seven other people, and generally living a rather tough life in the barren and hot Sahara desert. The long stage was 86km. As an elite runner, Elisabet had started three hours after the main field, which set off at 8 a.m., and as such was passing a lot of runners along the way. This was encouraging and inspiring, though sometimes also challenging, especially when she received reports about her competitors and had been expecting something more uplifting.

‘I had won the preceding three stages and had a margin of 22 minutes going into the long stage. For a stage that will take somewhere between 9½ and 11 hours to complete for the female elite, 22 minutes really is not a big cushion.’

Nathalie Mauclair, trail world champion and expert at this distance, in second place before the start of this stage, knew this and had set off at a ferocious pace to try to close the gap in this penultimate competitive day of the race.

‘So far I had enjoyed an exceptional race,’ said Elisabet. ‘This was due to my training and preparations, and also the mental focus I had applied since arriving in the Sahara.’

Prior to travelling to the race, Elisabet had come to see me for a technique session. We kept things really simple. She ran with her backpack containing all of her race gear (approximately 7.5kg including water) and I filmed her and applied sensors to her body so that I could record her running dynamics data.

‘When I saw the playback,’ she recalled, ‘I knew exactly what I had to do. I was folding forwards from my hips and wasn’t straightening up enough. As a result, the backpack weight became heavier than necessary, the form was not optimal, my stride shortened and this would of course impact how quickly I fatigued in the race and how fast I could move.’

This is when I reminded Elisabet of the figurehead analogy – something we had previously used to improve her posture.

‘I cemented this image in my mind, straightened up my whole body, and we did a retake. The difference was like night and day. I instantly felt it. The backpack was no burden. I ran effortlessly. I knew in that moment that I was ready for the race.’

The 2017 Marathon des Sables had an impressive line-up of elite runners. It was Elisabet’s fourth edition and she had previously won the women’s race in 2015, followed by a less than ideal (by her own standards) year in 2016 in which she finished fourth, just off the podium.

‘I wanted my crown back but I knew it would be very tough. I travelled to the Sahara a week before the race to attune my body to the environment. I wanted to feel like I was at one with the earth, in total harmony with the elements, and that I was working with, and not against, the mighty desert. I wanted to be able to feel that the ruthless sun, the soft sand, the sharp rocks, the hot, dry air, were not a hindrance, but in fact something that fuelled me with energy and that helped propel me forwards.’

On the start line of day one, the air was almost electric. You could feel the nerves and the anticipation of the 1200 people eagerly waiting to start. Some perhaps facing the biggest fear of their lives (after all, people have died in this race), others coming back to a familiar playground. Often dubbed the ‘Toughest Foot Race on Earth’, this event was not to be taken lightly. The desert is unforgiving and it is a test of survival skills and mental toughness as much as it is a running race. The countdown started accompanied by ‘Highway To Hell’ suitably blasting out of the speakers. And then they were off, with Elisabet completely focused on the task ahead.

‘I noted that none of the women really appeared to want to take the lead. Looking to the right I had about three or four of them running alongside me. I figured that maybe the pace was fast enough – that no one wanted to go faster at this stage. After all, that could be a very risky strategy. We had 250km ahead of us in five competitive stages and an “eyeballs out”

approach to pacing seldom pays off. Women generally know this and therefore you mostly see men attempting this fruitless strategy and paying big for it later. Nevertheless, I wanted to put my foot down. I wanted to show that I was back in shape, here to win and that anyone who wanted to beat me would have to work very hard to do so. I prepared myself mentally. I reminded myself of the figurehead and I cranked up the pace to one that was going to be difficult to follow, yet one I felt would not punish me too much later on. And surely it worked. One by one my competitors dropped off and only Nathalie Mauclair remained. After 5km she too had to drop back. This was good because I knew I wouldn't be able to sustain that pace for much longer but the job was done. They had been informed. I could now relax and adopt a more sensible pace. I won the stage and the following two stages with good margins.'

However, as the race progressed, Elisabet eventually found herself well into the fourth stage with nearly her whole lead from the previous stages wiped out.

'I knew I had to do something. I tried to be kind to myself. Tried to say that it doesn't matter if you get second place, that it's still good. It wasn't very satisfying. I approached the next-to-last checkpoint before the finish with about 20km to go. At this point I had heard reports that Nathalie was 20 minutes ahead. Now the sand became less and less frequent and we had a sandy dirt road to the finish. This meant running was substantially easier. I made one last effort to be positive. I told myself it's not over until it's over as I actually didn't know anything about Nathalie at this point.'

That's when Elisabet's work on her posture paid dividends.

'I envisioned myself being a proud, tall figurehead, I took a deep breath and inhaled the support and energy from the earth, the star-filled sky and the moon, and then I ran. I ran for the next two hours and saw nobody. Not even a camel. I listened to music, I repeated my mantras, I thought about the figurehead. And then I saw the lit camp in the distance, the finishing arch. I ran towards it. When I finally crossed the line, in 9 hours and 41 minutes, I couldn't believe what I saw. Nathalie was there, having just finished, proudly taking interviews from journalists. Someone shouted "There is Elisabet!" and suddenly all attention turned to me. Nathalie turned around and her jaw dropped, her face clearly showing this was the last thing she had expected. Then she quickly gathered herself together and gave me a

hug. She had finished less than two minutes ahead of me. In the final 20km of the race I had made up almost all of the time that she had taken from me. I had done it by applying the best focus and posture I could produce at that point, and channelling all of my remaining energy on reaching that finishing line without negative thoughts distracting my performance.

'In the final stage, "all" I had to do was run a marathon and not let Nathalie win it by more than 20 minutes. I achieved that. It was a very tough day but I got the job done.

'It is without a doubt that I can say that the work we did to improve my posture and accentuate the length of my spine was instrumental for my second victory at the Marathon des Sables. To be able to glide effortlessly over the sand in 40 degree heat and with a 7kg backpack is not an easy thing to do. I ran the fastest average pace ever achieved by a woman in the history of the race.'

London, England

The Natural History Museum in London has always held a great fascination for me. I have been going since I was a young boy and, in those early days, one of the most memorable things was always the skeletons in glass cases. Skeletons of a multitude of species, including humans and our ancestors. As a youngster, I used to imagine that, if the glass cases were accidentally left open, the skeletons could leap out and make a run for it!

Little did I know at the time that these early images of marauding skeletons would actually provide an interesting insight into our deep-set view of the human body. We see the skeleton as the main structure from which everything hangs. But when I watch a cheetah or a hare run or see a human being moving beautifully, that theory just doesn't make sense. That's why, when those runners in Bekoji left me in their slipstream, it was my biomechanics-led mind that was confused. What I was seeing was something far more fluid, elastic, synergistic and connected than I could possibly relate to my then view of the skeleton. Something just didn't compute.

Our posture is vital to our ability to achieve beautiful movement. Ever since that first seminar with James Earls, I have never been more than a metre away from a tensegrity model. I believe it's the perfect way to

understand and visualise the relationship between our bones and our fascial system. And not just for understanding how ‘perfect’ motion works. I once presented to a group of physios using a tensegrity model. After the presentation, I put all of my equipment into the boot of my car and drove off. A few days later, I retrieved the equipment only to find that, in my haste to beat the traffic, I had put my projector on top of the tensegrity model, which was now feeling very sorry for itself. As it sat in the palm of my hand looking like it was bearing the weight of an invisible force, my irritation soon turned to excitement. Of course! The whole point of tensegrity is that everything sits in a sea of tension. If we change the environment in which the model sits, that sea of tension will change accordingly. The heavy projector was alien to the model’s natural environment and so the model changed its sea of tension to accommodate it.

This is the challenge that we face every day. We are constantly putting our bodies in a sea of tension that seems perfectly natural today but would be completely unnatural to the hunter-gatherer whose body we are still attempting to take into dynamic movement. Remember, our dynamic movement is largely based on posture and our dynamic posture will only ever be an extension of our everyday posture. How we sit, stand and walk is therefore vital to how we run. Our fascial system is constantly rearchitecting itself and will learn if we change our habits and correct inefficiencies in our posture.

The underlying message is simple: we are in training every day of our lives. We must work on that everyday posture so that when we want to be dynamic we are able to do it with ease. That means when we are sitting on the train or at home, when we are looking down at our mobile phone or even when we are making a cup of tea, we must be upright. We must not slouch or stand with our weight only on one leg.

We can even use a day in the office to our advantage. Instead of slumping into our chair, we could spend the day standing. If you are standing up tall with even weight on your hips, a neutral pelvis, a lengthened spine, on tripod feet, head up with your computer at your eyeline and breathing deeply and rhythmically then you are training to be a good athlete all day long. You are teaching your body that this should be its default. If you spend your day at a desk, the best investment you could make to improve

your running is not a new pair of trainers or a fancy new watch, it’s a standing desk.

I believe that in the very near future, bad posture caused by sitting badly will be classed as a disease. Even if you are not training for a marathon or even thinking about your first parkrun, loading your body correctly and investing in your quality of life is surely a no-brainer.

Finally, for good posture when you run, you need to relax. Don’t fight it. Elsewhere in this book we talk about creating tension in the body’s elastic system. That can be achieved by being tall and accentuating that graceful posture, but it should not be confused with being tense. Negative tension in our muscles is one of our biggest enemies. It hugely affects the way we move. If you are tense, your back will be tight, your arms will be high (thus not powering you forwards) and you will be confining your movement. That can only restrict your performance.

THE HEAD

If you ask someone about the role of the head in running, most people will immediately start talking about the benefits of a strong mind in athletic performance. I do not doubt that role – it's hugely important – but there is a far simpler and more achievable message that I am trying to deliver. One where 'using your head' takes on a completely new meaning to you as a runner.

I am talking about your head as an object, not as a brain, although getting this right could be the smartest thing you do. The correct head position will maximise your elasticity, proprioception and weight distribution, give you an incredible psychological boost and, as an added benefit, optimise your ability to take in the views!

When the human head is up and the eyeline is on the horizon, it weighs 12lb. This actually shocked me when I started my research into the weight distribution of the body. Imagine my horror, then, when I realised that, for every inch your head tilts forwards and down, you add an extra 10lb to the weight on your spine. Think about that. If you are running around looking at your feet, tilting your head down 3in, you're basically running around with a 42lb head! That equates to 5 gallons of water or the weight of an average grown adult male's leg. It's like going for a run with a small child on your back!

These days, we spend so much time with our heads down – staring at a computer or a small screen in our hand – that we have a deeply ingrained habit of looking down and it has spread into our running form.

Back when we were earning our living by catching food (and trying not to be caught as food), keeping our eyes on the horizon would have been a fundamental survival instinct. We are still this animal. We've just forgotten because most of us have never had to worry about hunting or being hunted.

To be a good athlete, as I hope I've made clear, we need to move the way a human was designed to move. I believe that's with our head up and our eyes on the horizon.

The eyeline is critical. The head position will always follow that. If our default position is looking down at our feet, that small child will always join us on our run. If the default position is head up and eyes on the horizon, we can leave the child at home. Talk about taking a weight off your shoulders!

When I first worked with Beth Pascall she had already excelled as a trail and ultra runner, winning the Lakeland 100, the Highland Fling and The Spine. As well as working together on cadence and stride length, one of the things that we noted was her tendency to look down as she was running, particularly when she was ascending. We talked about this and, as a technique for encouraging her to keep that head held high, I attached some kinesiology tape to her head and ran it down her spine. This was so that she could feel the tension that was created when her head was facing forwards and where that tension was lost if she were to let her head drop. She immediately took this on board and implemented it brilliantly at the UTMB, as she recalls below.

The Ultra-Trail du Mont Blanc, France

'I had a plan and I was going to stick to it. I was nervous, yet quietly confident. For me, the UTMB was the crux of the year, and perhaps of my running career so far. There are so many mistakes to be made and so many external factors trying to sabotage my carefully considered strategy, but I was going to stick to it. I gathered inspiration from my competitors and found motivation from simply being part of what might possibly be the greatest mountain race on the planet.

'For the best part of the preceding year, my heart rate had quickened at even the mere mention or contemplation of this race. The spirit of this 107-mile circumnavigation of Europe's highest peak had captivated me, and all my energy in that year had been chanelled towards running the best race I was capable of. No stone had been left unturned when it came to preparation: I had barely missed a training session, I had changed my diet, I barely drank alcohol and I made an effort to get quality sleep. I also spent

three weeks in the Alps prior to the race acclimatising. In addition, I paid more attention to how I ran. I became more aware of how my body was moving and how I could move more efficiently across technical terrain.

'I was focused on my race plan: go out easy, build, race, finish. I was well off the pace in the first few hours, so far down the field that no one was even counting. It was right. I was where I wanted to be. Without making any move or conscious increase in pace, I began to climb up the field. 13th at 40 miles, 11th at 48 miles, 7th at 56 miles, 7th at 77 miles and still 7th at 87 miles. I was getting tired but I wanted more than this. This was the moment. It was now time to race.

'I am conscious that when I become fatigued my head tends to drop and I become more hunched over. I used to think it was an inevitable consequence of the fatigue accumulated by this stage in a race. I couldn't have been more wrong, and the results have astounded me.

'I was climbing out of Trient, with only two big climbs to go until returning to the finish in Chamonix. The springing, nimble steps of 50 miles earlier had long since disappeared. I was running with my head bent over and my eyes heavy in their sockets. I had to give it everything I'd got, but I was scared I had nothing left to give. This was all I had worked and trained for. As I was shuffling along I caught a glimpse of another runner through the trees, perhaps 100m above me. With the excitement I started to climb strongly, my arms and legs rhythmically carrying me upwards. I kept looking. My strides became more confident and I kept my head high. I was gaining on the women ahead of me, and the closer I got, the less hard I was working. It had almost become effortless. I knew that holding my head high was having a small effect on the physiological cost of my movement, but how different I felt! I caught her and told her that she was doing great as I strode past. She nodded in acknowledgement but didn't have the breath to reply. She didn't attempt to chase me and I could tell by the look on her face that she knew she was beaten. She was broken. She wasn't beaten because I was fitter than her. This wasn't a battle of physical prowess any more. I was just as tired, I was sure of it. I beat her because, by holding my head high, my perception of effort had reduced.

'With a new tenacity I kept up the pace, eyes fixed on the trail zigzagging above me. I saw two more women. They looked tired and hunched over. Knowing they were struggling gave me a further psychological boost. I

caught them quickly and the process was repeated. I looked up, focused on the horizon, which was the top of the pass. My posture told them that there was no point in chasing me. Only I knew that I was struggling. I continued to work hard and summited the pass before descending for a couple of miles through the trees. I looked back and there was no one there. I slowed a little and gave myself a few minutes' respite to physically recover and refocus.

'I kept my head high. The end was now in sight.'

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Experiences like Beth's certainly reinforced my view that good head position is vital for achieving efficiency in our movement. At the time I didn't know it, but on subsequent trips to the Himalayas and then back in Goa in India I began to understand that the reason for keeping our head up isn't just about keeping the weight off our spine.

Himalayas, Nepal

The small settlement of Talakharak was a stark contrast to Kathmandu. Consisting of about 40 houses spread sporadically across the mountainside, it took over an hour to go from one side of the village to the other. Terraced farmlands draped the slopes and a background of epic snowcapped peaks surrounded the green, luscious land.

I'd flown into the colourful, vibrant and chaotic capital city of Nepal several days earlier. Kathmandu had been a crazy place 20 years ago when I'd visited but it had only got considerably more crazy as more and more Nepalese had moved away from rural communities and into the city.

My guide, Karma Sherpa, had been waiting for me at the airport and we drove to a guest house for a few hours' sleep before rising at 4 a.m. for the long journey to his home village, deep in the heart of the Himalayas.

The minibus that greeted us was spacious. I climbed into the front but had visions of lying across the back seats and getting some sleep later in the journey. After all, there were only two of us. It soon became clear, though, as we made several stops on our way out of the city, each time collecting more people, that this had been wishful thinking on my part. By the time we reached the edge of Kathmandu there were 11 of us and I was sharing the

single front passenger seat with another traveller. There would be no sleeping on this gig!

We finally left the madness of the city, weaving around the traffic, holes in the road and the odd monkey, and the scenery changed dramatically. As the road became less of a road, we stopped and transferred into a waiting 4x4. All 11 of us! If we'd thought that the minibus was tight, this was a whole new level of cosy.

The terrain became bumpier, too, and we eventually turned off the dirt tracks and on to a road that had literally been carved and blasted around the edge of the mountainside. At times, we were driving with the wheels on the edge of a frightening drop. Every time we met another vehicle there was intense discussion and deliberate and precise manoeuvring before we could continue on our way.

The journey took 18 hours. At one point, the drive shaft fell off our vehicle and had to be fixed on the road, blocking all traffic.

Eventually, we reached a section of road that had been recently damaged by a landslide and that was the end of the uncomfortable 4x4 ride. From now on, our journey would have to be on foot.

After a short sleep in a tea house, we trekked for 14 hours along stunning mountain trails, eventually reaching Karma Sherpa's home village.

Karma Sherpa had created the healthcare centre in the village and I soon realised that he was like a local celebrity there. He hadn't been back for two years, so it was a real homecoming for him. And this time he was accompanied by me – a white guy with red hair who was, once again, sending the local children scattering!

Tea drinking is a national sport in Nepal. They have sweet tea, butter tea, hot tea, cold tea, black tea, white tea. Every tea you could ever think of. And it is served with this amazing ritual. When offered tea, you decline it and your host insists that you have some. However much you say no, they still insist that you have it. So you drink it. Then it gets to the point where you really don't actually want any more tea. But you are still saying no and they are still pouring!

During the eight days that we were there, we visited every single house in the village. I made 40 different visits to 40 different houses and, in the kindest fashion imaginable, I was force-fed tea by the gallon. I wasn't there to study tea though, of course. I'd come to study the local Sherpas and to try

to understand why they were so efficient at carrying considerable weight up and down the tough local terrain.

They do this by adopting an unusual technique, carrying incredible weights in wicker baskets tethered to their heads. I spent eight days trekking with them, videoing them, putting sensors on them, talking to them, trying to crack the code of why they do what they do and how they do it. I even tried to carry weights in the same way. At one point, as I huffed and puffed up the hillside, I watched as an 86-year-old woman carried a considerable weight back down the hill having trekked from another village. When I asked her about how she managed, she just said that it was all they knew. They were farmers and they were always on the move, all day long.

It wasn't for want of trying but I didn't crack the code on this trip. I simply came away with the thought process that they were good at carrying these weights like they did because they did it a lot. I returned to England with much to consider but it was a few months later, on a completely different project, that I really started to understand what I had just seen.

Goa, India

He was running around covered in white elastic strips, like an escaped mummy speeding along the roadside. I was in a tuk-tuk, chasing him with a camera. It must have been quite a sight.

I'd come to India to work with Pem again. As well as being an amazing mover, he was a yoga teacher. We'd agreed to get together for a week of work. He was going to allow me to study him as he practised yoga and we would work together on fascia and movement. Pem is a philosophiser and was very much open to experimenting and discussing our elastic system. We really wanted to simulate the lines of fascia that exist in our body in order to fully understand them, see how they react to different movements and be given an opportunity to accentuate them.

Over the course of the week, we simulated the major lines of fascia that we have in the body by trussing Pem up with strips of elastic. Every day we made a different line and then got him doing his yoga. It was enlightening for him, as he was suddenly able to see things that he could only feel before and he was able to start to fully accentuate certain movements to optimise

the use of his body's natural lines of elasticity. That's a man who has been teaching yoga for 20 years.

Then we got him running. Pem was a very dynamic guy. His mummified body really allowed me to see which lines of elasticity were working as he was moving. It was fantastic to observe which lines were cutting in. As his legs cycled beneath him, you could really discern the beautiful tension created and understand why this system works so effectively.

That's when we started to crack the Sherpa code.

We had these lines of tape running up Pem's whole body, from his feet up to the top of his skull. We were playing with some ideas, getting him to do different movements, and talking about the purpose of the elastic. I watched as every time he looked down, the elastic sagged and weakened. It suddenly dawned on me that fascia doesn't just create elasticity, it also creates a great amount of strength. And because it runs from the toes to the head, like any strong chain you need all of the links of the chain to be fully connected. So the reason I now believed that the Sherpas had so much strength when carrying something on their heads – and the reason why it's important to maintain our head position when running – is because carrying from the head and keeping that head as a final link in the fascial chain provides elasticity. That elasticity gives us energy and strength. Any chain with a link missing is weaker.

This means that if we run with our head up and eyeline on the horizon, we are not only maximising the tension in our elastic system but also building strength. We have a tendency to only think about our legs when we run. However, we are one connected system. We need to get used to the idea that we are so connected that our head position affects the amount of elastic recoil in our legs.

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There are, of course, some practical difficulties with this 'eyeline on the horizon' approach. For trail and mountain runners in particular, I can hear your objections already. Running with a nice light head facing the horizon sounds like a good theory but your head will be even lighter when you lose all of your teeth from the constant face planting you'll be doing as you trip over all the stuff on the ground that you're no longer looking at.

OK, so let’s be real. This is about your default. When we are running, as we look at an object in front of us, we hold that vision for 11 seconds. If we look down every five seconds and the default is the eyeline back up to the horizon, we are almost halving the amount of time that we need to track the object and moving with a light head. All too often we run with our eyeline down at our feet as a default and look up every now and then to see if we are going in the right direction. This means we have a much higher chance of running into a tree and the 42lb head is once again joining us on our run.

Sometimes, logic can come from an unlikely source. It took another session with the British diving team for me to see the benefit of adapting our movement to keep us light while functioning as we need it to.

Tom Daley has been winning medals since he was 14 years old, including several World Championship, European Championship and Commonwealth golds and two Olympic bronze medals.

During my time with the British diving team, I have had the privilege of working with Tom. On the very first occasion, I noticed that when he was diving backwards, he had a tendency to look over to his left-hand side momentarily as he left the board. With running, if the head is an inch down or back, it is creating a weight on your spine. For a diver, I felt that if the head was to one side, it would be off its axis and could affect the angle of the dive. Tom was very receptive to me pointing this out and was straight on to it. He even knew why. In the early part of his career, he explained, he was diving in synchronised events and so was looking across at the left-hand side to see where his diving partner was. The habit had stuck.

What he has done since then is to use this to his advantage, adapting this look in order to spot the water – and to get his spatial awareness – as he dives. If we liken this to a runner on technical terrain, we can start to use some of our habits to our advantage. When Tom dives, he now uses this momentary look to ensure that he knows where the surface of the pool is so that he makes a good dive. When a runner is on more difficult terrain, they have to look down. But what we should ensure is that the look is the exception to the rule. It should not be eyes on the ground with the occasional look up but, instead, eyes on the horizon with momentary looks down in order to see what’s coming up on the trail. That way, you can always take in your surroundings and, on those particularly difficult runs, at least when it appears in the distance, the end will quite literally be in sight!

ARMS

Most runners barely give a second thought to what their arms are doing. Often, they are allowed to take on the role of bad middle managers: they are there, kind of joining in, making all the right noises but, in reality, they are probably creating more problems than they are solving and, actually, likely to be making things worse. It may, then, come as a surprise to a lot of people that we, as a species, actually run with our arms.

OK, they may not be in contact with the ground but our arms are dominant over our legs and set the scene for the cadence and rhythm of our whole-body movement. If we use our arms dynamically, they provide propulsion. They also direct our legs (your right arm's movement should be symmetrical with your left leg and your left arm's with your right leg). In fact, this is going to happen whether we like it or not. The legs are just waiting to see what the arms are doing before they make their move. So these middle managers need to get with the programme. They must join in and take responsibility for our dynamic movement or they will quite literally lead our legs astray.

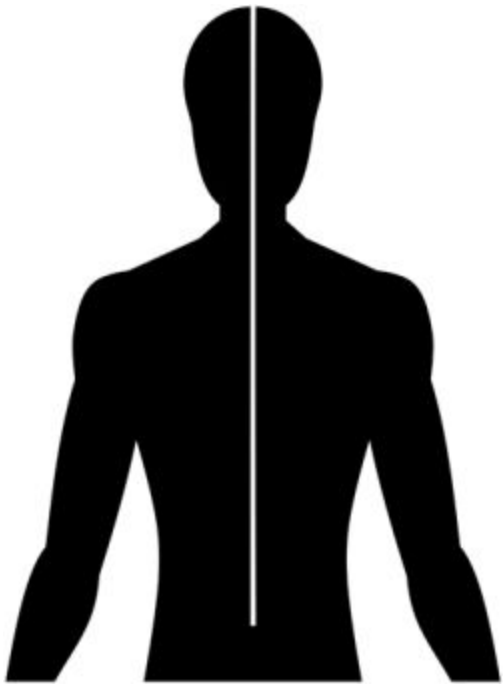
A common perception when we run is that all of the action happens below the waist (you can add your own joke here). We land on our feet and our movement is very much focused on our legs. It's very intuitive to think that we therefore run with our legs and that's why so many of us are oblivious to what our arms are doing. Some hold them high like chicken wings, others let them flap around freely and many direct them but with a huge amount of muscle tension in their body. If we believe that we run with our legs, it would seem obvious to take the arms out of the equation and, in our minds, move them in a way that uses as little energy as possible.

What we need to get used to is that, in elastic movement, there really isn't a big dividing line between the upper and lower halves of the body. In a

tensegrity model, our whole body floats in a sea of tension and we must engage the whole body in order to optimise our elastic system.

In fact, when we consider our fascial system, the lines are actually vertical and running up our body. They do not divide us, they connect us.

This is where I want to introduce a vital concept in achieving good posture and symmetry in our movement: it's something that I call the centre line. I always ask runners that I coach to imagine a line running from the navel up the centre of the body finishing at the forehead. This centre line goes everywhere with us and we should always try to visualise it. We should give it a name. We should even give it a colour. If we create a bow in our centre line, we maximise the potential of our elastic system and we ensure that we lead the run with our head and chest harnessing gravity. This elegant posture will bring our hips forwards and our pelvis into neutral and give our arms a central point to move either side of with balance and symmetry.



Our centre line

If you view the body this way, it is not about the upper and lower parts. It's not a separation of the legs and the arms. Instead, it is about a whole-body movement. The left side and right side, working to propel us

dynamically forwards with as much symmetry as possible. That's what I see when I watch great African runners move. That's what I see when I work with those moving as our species is designed to move. The arms, then, have a huge influence on the balance and symmetry of the body and act as a counterbalance to our lean. They also take away excess upper body rotation but still allow the creation of elastic recoil. This recoil is maximised by the symmetry either side of the centre line.

I had discovered this through working with many runners but, once again in my research, it was when something was absent that I really started to understand its importance.

Plymouth, England

Lauren Steadman is a three-times World Champion and six-times European Champion. She has competed at two Paralympic Games as a swimmer and has more recently specialised in Paratriathlon, representing Team GB in the sport's inaugural entry to the Paralympic Games in Rio in 2016, where she took home a silver medal. She was also a contestant on the BBC's *Strictly Come Dancing*.

When Lauren was born, she was missing her lower right arm. As a result, her right arm is (roughly speaking) half the length and half the weight of her left arm. She is a hugely talented and tenacious athlete who has enjoyed great success and I was really keen to work with her.

From our first track session, what became obvious was that her left arm was driving hard in front of her in an exaggerated motion in order to power her forwards. Subconsciously, I believe that this was to compensate for the lesser amount of force and direction being generated by her right arm. As a result, Lauren's right leg was overstriding. She was therefore landing well on one foot and heel striking with the other.

This effectively resulted in two different movements because of two different arms, demonstrating not only that the dynamic movement of our arms has a direct influence on the dynamic movement of our legs but also that a weight imbalance between one arm and the other can cause an imbalance in our symmetry, which can then affect our movement.

I have worked with many runners who run with a bottle or a phone in one hand, particularly during training runs. In doing so, they are having the

same effect on their own movement. In my experience, what's amazing is that when they aren't holding a bottle any more their hand is flapping around because the weight is then absent. If we work on the hypothesis that our legs follow our arms, then we are compromising ourselves in both cases: either by creating an imbalance because we are holding a weight in one hand or by creating a rogue arm that is doing its own thing when it is no longer holding the extra weight!

What I found fascinating about this first session was that, as soon as Lauren could see through video analysis that the imbalance in her arms was creating an imbalance in her footfall, she was immediately able to start the correction process purely based on feel. In Lauren's case, it wasn't just about trying to achieve more dynamic movement with her right arm, it was also about taking some of the dynamic movement out of her left arm to create better symmetry. This perfectly underlined the idea that beautiful movement is not all about power. Balance and symmetry win every time.

During this session, we also experimented by introducing Lauren's prosthetic arm into the equation (which she does not normally wear during events). This also made a big difference, as the weight and length of the prosthetic arm helped to equalise the weight imbalance.

Most, if not all, runners experience imbalances in their movement, often created by lifestyle, injuries or everyday posture. These do not have to stop us moving or maximising our dynamic potential but we do need to be aware of them and take ownership of moving well in spite of them.

As with many of my movement workshops, I learned so much from working with Lauren, who went on to be ITU World Champion. I am confident that what we can learn together in the future will give some further valuable insights into the efficiency of our arms and their relationship with our legs.

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Lake District, England

While we are considering obstacles to good arm movement, we should pause to talk about poles.

Walking (or running) poles are becoming more and more prevalent at mountain running events. They are now a must-have fashion accessory as well as bringing certain perceived benefits. To be fair, I can see an incredible benefit in having two long stabilising forces that drive us forwards and upwards in a fluid motion. That sounds like a very sensible thing to own. I would argue, though, that we already have them. They are called our legs. And they have really clever interactive sensors on the bottom of them called our feet.

Clearly, we were designed to run over long distances without pieces of carbon in our hands but poles are not going away and I recognise the need to have an informed view. I have therefore conducted research with many runners using poles.

The big message from this research is that – in my opinion – you should not run with them in your hands.

As we have seen, there's a huge correlation between the movement of the arms and the legs. We have fascial slings that mean our right arm is connected to our left leg (and vice versa) and we are designed as a species so that our left leg follows the movement of our right arm. The moment you put poles in your hand, you compromise that hugely and it has a detrimental effect on your ability to move dynamically.

Jim Mann is a well-liked and respected fell and mountain runner. Among his many achievements, he once completed all three big mountain 'Rounds' (the Bob Graham Round, the Ramsay Round and the Paddy Buckley Round) each in under 24 hours and each in the same winter season.

I worked with Jim ahead of his win and course record at the Spine Challenger in 2019. When he was running on the flat, he demonstrated only a 3 per cent differential between the deceleration from his left leg and right leg. However, when we put a pair of poles in his hands, that immediately became a 24 per cent differential. It was very evident that he couldn't run with poles and move his arms quickly enough to drive his legs, so he went out of synch. We went to work on improving this immediately during the session and, by being aware of it, Jim was not only able to improve this but also to develop a clear strategy going forward for when he would and would not use poles.

In a lot of mountain races, we are not always going to be running. If we use poles when we are hiking uphill in order to take the load off our legs,

levering ourselves makes a lot of sense. Coming downhill is a different story. When I watch people descending with poles, it's very rare to see the pole hit the ground before the foot. I'm therefore not sure what benefit they are bringing and yet they are taking the action out of our arms and disrupting our movement.

One person who was very keen on using poles was Mark Denby. We worked together specifically on his technique with them when he was preparing for the Spine Fusion.

'Previously, I had been a big fan of walking poles,' he admitted. 'As soon as I hit the mountains, I would use them and found that they gave me a huge boost because I could use my upper body to haul myself up a hill. In the latter stages of a race, your arms are fresh when your legs are not.'

One question I asked him was, 'What are you actually doing with the poles when you are running?'

'I was reasonably confident with answering that,' Mark told me, 'but the problem I had was stashing them when I wasn't using them. I would typically run with them and they were stopping me using my arms properly. With the Spine Fusion, I decided after training and thinking about the technique sessions that as long as I could keep bouncing, I probably didn't need the poles. So I put them in my drop bag and expected them to come out at maybe 50 or 100 miles. They stayed in the bag the whole time. I finished the race and never used them. The bouncing and the elastic recoil were all I needed.'

My view, then, is that we have to learn when to use the poles. They can be great for hiking and fast hiking but, if we are going to use them, we should put them away before we break into a run.

The Pavilion, Goring, England

I can't stress enough the importance of good arm movement. It is so beneficial to get this right. One person who has proven this theory is British runner Becks Ferry, who, since we started working together, has (among many other achievements) broken the course record at the legendary British ultra season opener, the Country to Capital race in the UK.

'"Oh my goodness! They're supposed to be arms not wings." That's what one of my friends came out with when looking at my race photos,' Becks

told me.

‘It was so true. It was almost like they were sticking out sideways and swinging across. Looking back now, I don’t know how I managed running with them. They were flapping around. The more tired I got, the more this happened.’

Thankfully for us both, Elisabet Barnes suggested that Becks got in touch with me and we met at the end of 2016 on a cold, grey, uninspiring November morning. The meeting, however, proved to be anything but uninspiring and grey.

As I often do, I started by highlighting how we use our fascial system to run and move and how the elasticity we create can assist us to run more efficiently and economically. Then I got Becks to run around the field and I took footage of her movement and recorded her running dynamics data from the sensors that I’d placed on her. For all of the data that we had at our fingertips, however, it was clear simply from Becks seeing herself running where an issue had arisen with her form.

‘When we looked at the footage of me running, my arms were flapping around seemingly of their own accord. The footage proved key – if a little embarrassing – to see just what my movement looked like.’

Being conscious of our movement is key. As soon as Becks could see her arm movement, she was very clearly conscious of it and could start to make some changes – most importantly, using her arms to drive her forwards rather than allowing them to become passengers in her movement and create a host of issues for her running form along the way.

‘Once the arms were fixed, my movement felt so much more connected and effortless. It took a couple of months of going away and doing my homework but just being mindful that the arms are part of the process was a big step. It felt strange at first running with arms that were where they’re meant to be (rather than where they wanted to be!) but the more I’ve done it and the more mindful I’ve become of doing it, it has definitely become much easier.’

Becks went to the London Marathon with her ‘new arms’ (as she put it) and took nearly 45 minutes off her previous marathon time. The adjustments that she made also proved invaluable on the two mountain races – the Everest Trail Race and the TransRockies Run in Colorado – that she then competed in.

‘Both these events were on much more technical terrain than I was used to,’ she explained. ‘I’m a flatlander, you see! I was physically and mentally out of my comfort zone. It is in events like this that small changes can yield major gains. Efficiency of movement is paramount here and posture is key. My running felt so much easier than I had anticipated and even my downhill running, which is usually my weakest area, became my strength thanks to the work I had done on my arms and my posture prior to the trip. Armed with an arsenal of advice and tips, I was able to move easily and my muscles recovered well despite the relentless downhill running. It made the running journey that much more enjoyable knowing that I had strategies to help me cope in these alien environments. It has transformed my running. I have shaved ounces of time from my road personal bests and finished up on the podium at the TransRockies Run – something that I never dreamed would happen to a runner like me!’

Our arms are vital in creating balance and symmetry in our movement and yet having wayward arms that move randomly (usually without their owners even being conscious of what they are doing) is one of the most common traits that I see in runners. We must take control of those wayward arms and engage them to take the lead in driving us forwards either side of our centre line. For most of us, it’s one of the biggest improvements we can make to our running.

A NATURAL LEAN

Gravity is our friend. If managed correctly, in the form of a forward lean in our run, it can contribute significantly to our propulsion. It's vital, however, that this lean does not come from the waist but instead involves the whole column of the body.

Dan Lawson is an elastic runner. He was before I ever got in front of him. He has a string of course records to his name (including the Grand Union Canal Race), a World Championship gold medal (at the IAU 24 Hour World Championship), and a second-place finish and second fastest British time ever at the epic Spartathlon in Greece. He is also one of the nicest, most relaxed and friendly people I know. If there is anyone I have worked with from England who runs like a Kenyan in terms of both their body and their mind, it's Dan.

When we met in Goa (at the time when we also met his friend Pem), we focused on perfecting a natural lean – something that I felt, given how good his form already was, could bring some gains to his running.

Goa, India

Dan and I first encountered one another at a Team GB 24-hour running squad meet-up. I presented to the team and Dan was genuinely intrigued and energised by my talk on elasticity. We resolved there and then that we'd work together and, a few months later, I went to Goa for a flying visit to see him and take a look at his running.

In order to ensure that Dan was equipped to carry on our work without me being present, the first thing I had to do was convince him to embrace technology. Dan was a self-confessed cynic when it came to any kind of running tech. However, once I showed him the running dynamics data that

we could get just from a commercially available watch, he immediately understood the benefits of tracking this data in order to analyse the effects of changes in his movement.

‘I think the calculation is that in a 24-hour race most runners will take around 240,000 steps,’ he recalled. ‘So imagine if you were able to increase your stride by a few centimetres. The gain would be in kilometres! By connecting me up to a watch that measured my running dynamics, this is what we set out to do.

‘I had only ever used a watch to keep an eye on pace and mileage and had no idea about all the other insights it can tell you. Now I could pinpoint exactly what movement in my body would increase ground contact time or stride length. The information was what you might imagine you’d get running in a lab with lots of wires stuck on to you and screens beeping. But we were on a dusty road in India with a watch and a chest strap.’

Dan’s biggest concern was that any kind of technology could take away from the simplicity of running – something I was keen to stress was the opposite of what I was ultimately trying to achieve.

‘If you’d asked me about this kind of technology before, I might well have been a little sceptical. It’s not really the essence of running! That freedom and stillness we receive from flowing in the moment. But strangely enough it has brought a much stronger mindfulness to my running.

‘I’m running now with a bigger than ever awareness of my body and how beautifully it all moves as one. The feedback from the watch has shown me how a quick body scan and a subsequent letting-go of any muscle tension can effortlessly improve my pace.’

Once we’d got Dan used to the idea of using running dynamics data to analyse the results from changes to his movement, we could really focus in on his form. I already knew that Dan was running with a very elegant and beautiful gait but I still felt we could improve his running by incorporating more of a natural forward lean.

I explained that Dan needed to allow himself to fall forwards from the ankles and ensure that the whole column of his body went with him. The danger is that we naturally bend forwards at the waist in order to lean when we should in fact be inverting our hips and creating a bow from our chest.

‘It took a bit of getting used to,’ Dan remembered, ‘but has become a fantastic tool for my running. I love it when I feel my body lean that bit

further and my stride length and pace begin to surge before pulling back slightly. It's like having an accelerator pedal. It's great fun to play with this. When I get it right, it feels like I'm increasing my speed without using any more energy.'

What's been extremely rewarding is seeing Dan put this into practice in competitive situations.

'I now use this a lot in races,' he told me. 'Before, if I'd looked down at my watch and realised that my pace had dropped slightly or if I was chasing someone down, I'd have put in more effort, gritted my teeth a bit more, and tried to work harder. Now my response is to concentrate on that natural lean and go with it. It's so great. You're not putting any more energy into what you're doing. It's just a subtle adjustment in the way that you're moving. Lean forwards, push out my chest and invert my pelvis. I just concentrate on that – it's so refreshing not having to expend more energy but to get faster by focusing on my body position.'

All of this comes back to that dusty track in Bekoji. The bow from the chest and that 'accelerator pedal' created by a natural lean was a huge factor when those runners left me in a gasping heap on my very first run in Ethiopia. And, just like those runners, Dan is deeply connected to the act of running and is very reluctant to overcomplicate things. This is something I wholeheartedly embrace. Natural movement techniques are, by definition, not meant to be difficult or contrived. They are pure and, once we become used to them, should be intuitive and connected.

'I'll be honest, I just like running,' Dan explained. 'I love getting up on the South Downs. It just so happens that I won a couple of races and ended up running more competitively. I've always been quite sceptical about science and getting too technical. I don't want anything to take away from the joy of running. If it does, then I tend to shun it because there's a risk that it will dirty the experience for me. I was therefore a bit worried about even looking at my technique. I thought it might all be a bit too much. But it really surprised me. Rather than taking an awareness away from my running, it's actually brought me more in tune with it. When you focus on your movement, you spend a lot of time being aware of your body position and what's happening, which brings you right into the moment. I love that. It has put me even more in touch with the essence of running.'

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Our challenge when creating a lean is to maintain the tension in our elastic system and keep the head up where it belongs (with the eyeline on the horizon) and still ensure that the skeleton takes the weight of the body. If we are not careful, we put in too much lean and bend forwards from the waist. The trick is to have a subtle lean that feels as though it comes from the ankles by creating a bow with our centre line.

The more we lean, the more our stride opens up to accommodate the lean – so, when we master the art of leaning, we can use it as a gearing system: lean more and we speed up as our stride increases, lean less and our stride shortens and we slow down.

A great way to practise this is to go to a parkrun. Lock into your cadence, ideally 175–185 steps per minute, and then use the lean to reel runners in. Then, if your competitive side can stand it, let them leave you as you decrease the lean.

Running with a lean is a beautiful thing but as with most gait changes it comes with its challenges. Your brain likes you to be upright, where it feels that you are safe. Even a small tilt forwards can send the amygdala in the brain (responsible for our survival instincts as well as other things) into overdrive and it will do its best to stop you leaning. The amygdala is what starts flashing when you prepare to do a parachute jump for the first time. It doesn’t like the idea and thinks you’d be better off not doing it. You could argue that it has a point! But leaning an inch forwards in a grassy park? As always, the brain cannot wait to save you so be prepared to take on this challenge. Once the amygdala sees that not only will you not die if you lean but that you will move more efficiently, it will allow you to make the move unencumbered.

This is one of the hardest techniques to master and requires an investment of practice and patience. However, as we have seen with Dan, the dedication is worthwhile. This key technique will give you an extra gear to go to when running and provides a personal accelerator pedal that you can readily access without having to grit your teeth and simply work harder. And I don’t know many runners who wouldn’t want to invest in one of those.

BREATHING

It may sound odd to think that breathing can affect our running form. However, what I have learned is that it is vital, not only in promoting good form, but in maintaining it. Oxygen is so fundamental that we tend to panic if we feel we are not getting enough to service our needs, and our movement radically changes. Paradoxically, if we change our movement or intensify our running, our breathing pattern can be negatively affected, leading to problems with maintaining our form. Our breathing and our movement are so inextricably linked that we must, therefore, understand the best way to breathe when we run and learn not to fall into classic traps as our session intensifies.

As we are looking at our movement, we need to be mindful of our breathing. I am not an expert in this area but I have over the years sought out the views of those who are. That includes consulting Dr John Dickinson, a Reader in Sport and Exercise Sciences at the University of Kent and a man who has worked with top Olympic athletes and football teams from the English Premier League specifically on their breathing techniques.

I asked John to help me understand and explain what our approach to breathing should be, particularly with a focus on our movement when running.

‘Breathing is a fundamental function for a human to sustain life,’ John explained, ‘but, in my experience, there’s no one-size-fits-all when it comes to advising the best way for an individual to breathe.

‘At high intensity, some runners struggle to cope with the increased demand for ventilation. This may be because they have a poor breathing pattern that does not allow them to appropriately ventilate their airway at higher levels of running intensity or because they switch to a poor breathing

pattern once the demand for higher minute ventilation rates are required. This can also be because they are trying too hard to breathe.'

This sounded all too familiar to me based on what I was seeing when runners tried to change their movement. With an increased cadence and change in running pattern, I was watching individuals adopt a breathing pattern that mirrored this change in rhythm. As such, they were taking quicker, more shallow breaths and getting into difficulties.

'This often manifests itself in overactivation of accessory muscles in the neck and shoulders and can lead to reductions in tidal volume and sensations of air hunger or unsatisfactory inhalation,' John added. 'Athletes who do this may find that they have sore shoulders after a run as they have been overusing them to breathe.'

Once again, it sounded like negative muscle tension in our form was our nemesis. We had to learn to relax in our running and relax in our breathing.

'Breathing should feel smooth and relaxed,' John confirmed. 'It should not feel particularly effortful nor be the thing that stops us completing high-intensity exercise efforts. The abdomen and chest should move in synchrony.'

John also confirmed to me that runners should focus on good running posture and technique, which includes running with little muscle tension in the shoulders and back.

So what else leads to good breathing technique when we are running? I'd previously read a lot about breathing through our nose but always struggled with it when I was running. I had also seen clients struggle with this concept and I couldn't see how it was particularly efficient. I posed the question to John.

'Nose breathing is the way to go when you are at rest,' he answered. 'However, it is not practical to maintain this when running intensity rises above light. The air passages of the nose provide too much resistance, which limits the flow of air into our lungs. Therefore, we should switch to mouth breathing when we are running.'

A lot of the athletes I was working with would struggle to find a natural breathing pattern when changing their movement, particularly when they were increasing their cadence. This resulted in far greater breathlessness than they were used to when running and appeared to cause them to panic, which does not encourage good movement. It seemed fundamental to our

ability to move fluidly that we had a comfortable breathing pattern. Or at least to understand that, at times, we would be in oxygen debt and to find ways to be able to cope with that and not panic. Yet, all too often, I could see people's movement go once their breathing went because they were no longer thinking about their movement, they were just thinking 'I need air'. I asked John for his perspective on this.

'Changes of movement can lead to changes in the way we hold tension through our bodies,' he explained. 'For example, moving from walking to running may lead to increases in muscle tension through the shoulders or holding tension through the thoracic region. This may also happen when we move from the flat to an incline or try to increase the pace to keep up with the pack.'

Again, John came back to that key word: relaxation.

'Despite changes in movements it is important for the athlete to allow their breathing to remain relaxed. The activity they are trying to perform may require changes in posture but this should not mean they have to hold tension around their chest or fix their shoulders. Runners should focus on good technique for the movement they are performing while allowing their breathing to gradually adjust to the change in movement. Sudden changes in the breathing cycle often lead to hyperventilation and increases in perceived effort, which ultimately limit performance and enjoyment of the activity.'

John also confirmed why I was seeing so many runners struggle as they changed their movement.

'When we are running, our breathing will be linked with our step cadence as our respiratory centre is receiving feedback from the locomotor muscles in terms of their movement. In addition, our respiratory muscles assist with holding posture. Therefore, when we run our breathing rhythm will in part be determined by the number of times we make contact with the ground.'

It follows, then, that if you go from a 160 to a 180 cadence, there's a good chance that your breathing will quicken. This is because the rhythm of your movement has changed, thus impacting on the rhythm of your breathing. You need to find a new rhythm, otherwise you are simply taking more shallow breaths than before and your performance and enjoyment will suffer.

I asked John how he thought I could help these runners address the issue they were experiencing as they changed their movement.

‘There is no one-size-fits-all approach to the number of steps a person should breathe in or out for and most people will find a natural rhythm. However, athletes should be cautious. If their cadence and respiratory rate are too closely linked, athletes can begin to hyperventilate during phases of high-intensity running efforts (e.g. running up a steep incline). If athletes are able to disassociate their breathing cycle from their cadence somewhat, they will find when they hit a hill or try to catch up with a competitor that they will experience a gradual increase in their breathing rate and depth. Although this may mean a short-term increase in anaerobic energy production, it will reduce the chances of falling into an inappropriate breathing cycle.’

That was helpful in terms of when we are running but we have already seen that our running posture is an extension of our everyday posture. I was therefore keen to know from John how our everyday breathing could affect our dynamic breathing.

‘Utilising good breathing habits at rest will promote good breathing patterns during running,’ he explained. ‘Breathing should be as automatic as possible and so entraining these good breathing patterns at rest will help continue them during exercise.’

So, when it comes to breathing technique, you can build this into your everyday life in a way that makes the most of the time when you are not able to train. John gave the example of talking to a friend and ensuring that when you breathe inbetween sentences you are initiating the breath from the lower rib cage rather than moving your shoulders to take the breath in.

You can also take it with you to the office. How you sit or stand at your desk and breathe is important. If you are shallow breathing all day, you can’t expect to be doing much else when you run. If you can sit (or, even better, stand) at your desk tall and breathing from your lower rib cage in a controlled way, then theoretically you’re preparing your body to breathe this way. You may be at your desk and you may be stuck at work but you are training to build better breathing and better movement.

We should also be mindful of our posture. Breathing deeply and rhythmically is not just about creating good lung capacity. If you’re moving the diaphragm properly, then the muscles and tendons and ligaments that

are supporting the diaphragm and essentially holding it in a sea of tension are learning how to make that movement happen so that the diaphragm can sit beautifully in that elastic system and be fit for purpose. If we run tall, we open up our chest, and our capacity to breathe deeply during physical exertion is increased.

All of this made it very clear to me that, as we change our movement, we will very likely encounter some new challenges with our breathing. However, as with the movement itself, the benefit of practice and time – as well as the influence on how we breathe every day – should allow us to overcome these challenges and establish a new, more efficient breathing pattern.

THE MIND

Our mind has a huge role to play in our movement. As we have seen, when we are changing the way we run, we have to involve our brain to a far greater extent than we are otherwise used to doing. This is because, for most people, how we move is not determined by conscious action. It's something we do as a default and that default has been established by many years of living and moving. Changing that movement therefore requires conscious intervention – something that is challenging and can be tiring. But it doesn't stop there. Even when we have made changes and they become our default, our mind still has a key role to play in performance.

One of the athletes with whom I have worked and who has demonstrated this more than most is Simon Bayliff. He was able to put this to the test when he went to compete in a multi-stage event in the Namibian desert – a place where the extra-wide horizons and massive skies hide nothing and finishing the race is as much a mental challenge as it is a physical one.

The Desert Ultra, Namibia

'You can give up as many times as you like, as long as you keep moving. That's what my dad always told me.'

Simon was remembering a particularly dark patch he'd encountered during the penultimate day of the race. After overheating at the height of another 40°C day, he'd decided to hold back and preserve what little energy he had left.

'I had already planned on the final day of the race – the long 92km day – being my moment,' he explained. 'For me, that's where the race started. If I could hold my own in the preceding days, I'd aim to give myself a chance

of a top-five finish on the last. As it so happened, the podium remained a serious possibility.'

It would be tough for everyone. The competitors had already been going for four days and covered 160km of varied terrain across rocky mountainous trails, jeep tracks and dried riverbeds. At night, they were camping and getting very little by way of sleep. Rations were depleting and the general wear and tear of a week in the desert was now deeply etched into their faces. Simon, though, was in his element.

'This is what I had prepared for,' he told me. 'The sand. The heat. The discomfort. This was my place. I was cool eating meals with sand in. I was fine with the smell of elephant shit. I was OK with not sleeping well. I knew that I could suffer. I knew that I could go to some very dark places – right to the bottom of the barrel – and somehow climb back out again.'

Simon had been there before, in the Yukon. Twelve days of extreme cold and dark, digging deeper than he'd ever had to before.

'It was a very tough time,' he recalled. 'But in a sick kind of way I loved getting to the absolute end and seeing what my body would do. Seeing what my mind would do. That fascinated me. I felt that I grew massively in those moments. I thrived on them. I'd come to know how my body responded and how far I could push myself.'

Back in the desert, Simon was putting all of his preparation into practice. His mental preparedness was absolutely key to his ability to stay calm.

'I had visualised this day repeatedly and considered every possible outcome. I had left very little to chance. I could now get all of the noise out of my head and focus on what I needed to do.'

They started the final day in the dark. It was 4 a.m. Runners had endured a 2.30 a.m. wake-up call so they could eat and get prepped – head and feet. Simon put some of that thinking into action right from the off. He knew that he had a target on his back, having put himself into third place since the end of day three. There were a few guys at the front struggling with bad feet or stomachs and he'd taken full advantage in the earlier stages. The start was a 2km ascent of a giant sand dune to begin with and, having grown up in the English Lake District and Middle East with a former professional rugby player turned fell runner for a dad, Simon knew that this played to his strengths. He knew that he could get away from his nearest rivals if he could just keep out of sight and not have them hanging off his coat-tails.

Simon switched off his head torch and ran into the darkness, relying purely on light from the stars and the distant glimmer from the head torches of the two runners who had bolted into the lead, their beams snaking their way up the trail in the distance ahead of him.

It worked. He got away and didn't see another runner for the rest of the race. By the end of a long and gruelling day, he was third overall and only three minutes away from second. Four professional runners had lined up at the start of day one with a bunch of amateurs (Simon included). It was an incredible achievement. Simon was not by any means a full-time runner. He trained around family life and managing his own business. He was part-time at best. He'd punched well above his weight and there was no doubt that a combination of meticulous preparation, efficient movement and positive self-talk had got him there.

I was lucky enough to be in Namibia researching and crewing the race when Simon put in this performance. I had worked with him on his movement in the build-up and was aware that he could be a competitor. However, you had to watch him and talk to him every day to truly see what set him apart from the majority of the field. It wasn't just his efficient movement. Simon quite clearly thought his way across the desert.

I met up with him in a private members' club in London to talk about his experiences. It was certainly a different environment to the one I'd shared with him in Namibia. Simon is personable and charming. A talkative sports agent who is both engaging and inspiring, especially when he talks openly and humbly about his running.

Simon was not always a runner. He grew up playing rugby, representing England until he was 18. That came with lots of physical demands and running was part of the equation but never the focus. He was a high performer – having studied human biology at Loughborough, he now ran his own sports management company, representing Premier League footballers and high-achieving athletes. That all went a long way to explaining his granular approach to competition.

'After I left uni, I started adventure racing,' he told me. 'Multiple days on foot, on bikes, on canoes. Orienteering. I just fell in love with it.'

'My two best friends and I then entered the Marathon des Sables in 2007. There was me, one mate who was a former Great Britain steeple runner and

the other who was a former professional World Cup downhill skier. We were a right bunch of misfits.'

This is where Simon started to demonstrate his penchant for meticulous preparation.

'I approached MdS exactly how I approach everything,' he told me. 'I was very detailed and very driven. It was very much about every step of a process being thoroughly planned and researched to achieve a result. I didn't leave anything to chance.'

That went to a micro level. Not just what socks and shoes he was wearing or what food he was eating but thinking about and planning how he was going to feel in the desert at 40°C, where things would start to chafe. How the food would taste in those conditions; he would go on runs with microwaved energy and electrolyte drinks to replicate liquids warmed by the heat of the sun.

'The MdS sounded seriously hardcore,' Simon explained.

'I booked on all of the courses and anything that was on offer to find things out and build up my knowledge. I gathered intel and trained extremely hard. All the time, I was building up mileage and getting stronger as a runner, dropping weight and going a little bit faster. But I was still effectively a plodder. I was a 90kg former rugby guy. But what I did have was the ability to suffer. I could hurt more than most people and I was comfortable doing it for days on end.'

For all of his concerns over his running ability, Simon had ensured that, in terms of his mind, he was ready to take on whatever the race threw at him.

'By the time I rocked up, I felt like I had done as much as I could do without actually being there. A lot of that process for me is in the head. It's visualisation. Every run I was thinking "What will it be like there?", "What will it feel like on my feet?", "How's my stomach going to feel?" All of this inner talk was designed to get me as close as I could to what I would face.'

As I had seen in the Amazon, many runners came unstuck simply because they were suddenly thrown into an alien environment and the need to consciously engage with their surroundings and their movement within those surroundings severely challenged their performance.

'I believe that the stronger your visualisation is, the smaller the step up to reality will be both physically and mentally when you arrive,' Simon added. 'You need to prepare for sore feet and eating meals with sand in. You need

to prepare for the strange smells and discomfort and lack of sleep. If you don't, it can throw you and you may never properly recover in order to perform to your best.'

For all of his preparation, Simon didn't have to dig as deep as he suspected in order to finish MdS. He did, however, realise that he needed to complement his mental preparation with changes to his movement.

'I definitely held 10–15 per cent back every day in Morocco waiting for this incredibly tough experience to happen. When I got to the finish line, I was a bit disappointed if I'm honest. I could have raced harder. I could have done better. I still learned so much about my body, nutrition, feet, shoes and heat. I also knew my biomechanics were awful. I didn't feel flow, I didn't feel like I could move with any sort of lightness. That was the first time that I was aware of something not being right.'

When Simon came to me, he had already picked up a few good habits but it was a classic case of focusing only on one or two elements of form rather than a full-body analysis. Having some but not all of the key ingredients.

'I studied human biology so I knew that if I was going to continue down this road, I was going to need to change. I needed to drop my weight, change my diet and I knew that I had to work out how to be a runner. It's not as simple as just going out running. People are fast because they have a technique, like all sport. I thought that there must be a technique that I can learn. I did some basic research and had picked up that an ideal cadence should be around 180 per minute but you could still hear me thudding down the path about a mile away!'

'I went to the Yukon Arctic Ultra, then to the Jungle Ultra in Peru, to the Atacama Crossing in Chile and to the Gobi Desert. All the time, I was getting smarter. Race smart. Kit smart. Working out all of the processes, from taping my feet to what food was right for me. All the minute brain-wrecking detail. I knew, if I failed here, it was down to me. But I still felt clunky. I was getting sore hips. I thought "It can't be right".'

Simon and I worked on a few things during his first session and he went away to practise. When I next saw him, the difference was incredible but he had already been through a journey of his own to get there.

'I had an open mind but didn't know if I 100 per cent believed in it. I was a little sceptical. I went away from our first session with four things to work on: head position, chest out, arms powering me forwards and cadence. I

called that “H-CAC”. I would say it over and over again in my mind. Head, chest, arms, cadence. Running through the list and checking that I was doing each one correctly.

‘I had a watch that gave me running dynamics data and a heart rate monitor. I knew that I was starting with less than a metre stride length. I knew what my vertical oscillation was. I was going to aim to get another 20–30cm on my stride length. It felt counter-intuitive to me. I had nailed my 180 cadence and surely I’d now be overstriding and lowering my cadence.

‘I had to give it a go. I had three months until Namibia. I kept it all in mind. It was great for my long runs – where it could occupy my mind – but the first four weeks were really hard.’

Then Simon had a breakthrough.

‘I love analysing data and I started to see my numbers change. My stride was lengthening. Not 20cm but it went up by 10. It was now over a metre in total. My vertical oscillation increased but I was travelling further in less time and, amazingly, my heart rate data suggested it was with less effort. That efficiency was there in front of my eyes. I couldn’t argue with it. This was quantitative data showing me that I was improving. I thought “Wow – this is the secret sauce!”

‘When I saw the video on my second session, I honestly felt like there was the beginnings of a runner there. Not a top runner but a better runner. I almost didn’t recognise myself.

‘For Desert Ultra in Namibia, I felt stronger than I’d ever felt going into an ultra before. My kit was nailed, I’d raced in the heat before. I had my “H-CAC” mantra going on in my head and I was measuring time and distance, getting feedback from my body, thinking about when I was going to eat. I became so focused on the detail that I almost forgot that I was running. It became one fluid motion. That was the same from the starting gun to the finish line every single day. Head, chest, arms, cadence. Always checking in with my body and always keeping my posture right. It felt smooth and I was working hard but not in the red. It was right in my sweet spot. If only I could bottle that and drink it every time I went out for a run, I would.’

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What Simon was doing was creating his own personal checklist and using it when he was running and racing. I encourage you to do the same.

The brain makes up 2 per cent of our body mass but can use up to 25 per cent of our energy. Chess players can lose up to 3kg in a match, yet they are sitting down.

There is a huge amount of literature out there that focuses on managing the activity of the brain to improve performance in sports. Most focus on how to deal with our natural fight or flight inclinations when faced with a nerve-wracking situation such as a race. What I coach is that in order to ensure that we are relaxed we should be mindful of our movement, and in turn we will use less energy. Focusing on good form will allow the front of our brain to remain busy so that the back of our brain can relax, thus reducing the amount of energy our brain is using. This goes towards one of our key themes: running is not all blood and guts. It's not about taking on the challenge. It's about beautiful, controlled movement.

If you can focus on your movement as you run – considering every part of your body and how it is functioning and running through a checklist for your gait ('How is my foot landing?', 'What are my arms doing?' etc) – that keeps you very much in the moment and in touch with your body. That simple task – as long as we are working on reinforcing what we have learned rather than trying to change our movement at the same time (which, as we found out from Sam Marcora, can be extremely cognitive) – allows the back of the brain to relax instead of guzzling oxygen and calories that could be propelling us forwards. So, we become very relaxed in our movement.

'Once you know about it,' Simon agreed, 'you will never get it out of your thinking. Foot strike, lean, head, chest, arms etc. It's like standing on the edge of a cliff, knowing all of these theories that should work if you trust them and get everything aligned. But unless you trust it, leap off the cliff and allow your wings to spread and fly, you're never going to find out. If you doubt it, it won't work.'

Dan Lawson has had great success in the 24-hour race format, including winning the IAU 24 Hour World Championship in 2016 with a distance of 168 miles. I asked him how important this mental checklist has been for him during these events.

‘The 24-hour races are a different animal to all of the other ultra races. It’s more of a mental test than any other race,’ he told me. ‘You’re just going round and round on a 400m track. There’s no point-to-point journey. No change of scenery or differing terrain to break up the boredom.’

As a mental battle, it doesn’t get much tougher. When we run a long way, we tend to want it to be over as quickly as possible. In a point-to-point race, the quicker you run it, the quicker it will be over. Within our own limitations, we are therefore compelled to get it done. However, in a 24-hour race, the time is set and so your mind thinks ‘If I run this fast, we’ll just be running further’. In a way, you’re making the finish line further away. But you need to be running it relatively fast in order to compete.

In the same way, when you are running, you are dealing with your mind’s natural inclination to tell you to stop. In a point-to-point race, your mind can break down the race into manageable chunks. Perhaps a few times in the race you’ll get to an aid station and your mind will say ‘You could stop now’. However, most of us can override it. In a 24-hour event, you are usually on a 400m track, so you come around to the aid station every minute and a half. Each time, you cross the ‘finish line’. Each time, you have an excuse to stop. As a mental battle, it’s pretty constant. That’s where focusing on something that is not too complicated (because we don’t want to get tired from mental exertion) is important. And what better thing to focus on but our movement.

‘What helps is trying to get yourself in the moment,’ Dan explained. ‘Focusing on your body is great for this. When I start to feel my mind wandering and focus on negatives, I can go back to having an awareness of my body and body shape, whether my arms are in the right position, whether that lean is good, whether my pelvis is tilted correctly. Once I start doing that, another 20 minutes of the race has gone. Yes, arguably I could focus on lots of other things – like all of West Ham’s goal scorers during the 2012/13 season – but that’s not going to help my running form or performance. It’s brilliant that it works in two ways: I can concentrate and be in the moment but also I’m making sure I’m running as efficiently as I can. So, when I start focusing on how far is left or that I want to stop, that’s when I use it.’

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What we can also do with that mental checklist is make it a positive reinforcement, which contributes to a positive mental attitude. I am a big believer that positive self-talk and positive visualisation is a key driver to improved performance.

‘Seeing and visualising your form is important,’ Simon Bayliff agreed. ‘That shape is beautiful, seeing a runner in that moment where they have lean and their legs are driving underneath them with that bow from their chest. That’s what I try to achieve whether I’m running for a bus or during an ultra. That’s the dream.

‘I’m not going to lie. I don’t feel like Eliud Kipchoge when I run. There are various times when I still feel like a donkey chasing a carrot that’s hanging off the end of a fishing rod! But there are moments when it’s like a finely tuned instrument. I get the feeling, I get the energy return, absolutely everything is aligned and it feels fabulous.

‘You do of course still get tired. But it made a difference in Namibia. I didn’t deteriorate as much. I didn’t use as much energy. I travelled further for less effort. I was constantly thinking about what I was doing. I can tell you now, had I not incorporated these techniques into my running, I wouldn’t have got anywhere near the result I did.

‘For someone who likes to talk a lot, five days in the desert is a long time! People are always amazed that I can do it but being alone drives the talk internally and it is self-talk that gets me through. I can detach myself, almost pretending to leave my body and look down on myself, to help me focus and get myself back running again with good form. I’m really big on visualising so once I’ve seen myself in that shape, it’s a really powerful tool for me. I can run through the checklist in my mind and focus on every element, from good footfall to posture to what my arms are doing. I can lose myself completely in that.’

I once again wanted to discuss this with Professor Samuele Marcora, who is an expert in using self-talk to improve endurance performance.

‘From a purely psychological perspective, it doesn’t matter how much energy you consume. It’s all about perception of effort. That is the limiting factor. What you want to do is make running at 20km per hour feel less effortful. That will improve performance. Often, there is a strong correlation between this and our energy expenditure. If I drive my muscles harder, which is what I perceive as effortful, usually I am also expending

more energy. So often, if you do something to reduce energy expenditure, it will also improve your perception of effort and improve your performance. But there are also situations where you can completely disassociate perception of effort from energy expenditure. For example, when you are on a treadmill, as you increase the speed at which the belt moves, there is a point where you start to run. If energy expenditure were the key value, you would start running when running was more economical than walking. But most people start running when walking is way more economical than running. Why? Because, even if it is way more economical to walk, your perception of effort while walking is higher than it is when you start to run. Because perception of effort is the driver, not energy expenditure.

'Motivational self-talk can make it feel easier to run at a given speed,' he added. 'It can change your perception of effort. I am not just saying that. We measured it, so we have proven experimentally that not only can positive self-talk improve performance but it can also reduce your perception of effort.'

In my coaching, I have therefore developed a way of turning instructional ideas into positive self-talk. With this, you get more bang for your buck, not only using the cues to ensure that you are running well and giving your brain a simple task to occupy it, but also adding positive self-talk that will reduce your perception of effort and improve your performance.

As an example, instead of just ensuring that you are placing your foot with a tripod landing, you are doing it so that you have stability and feel elastic as you leave the ground. You are driving your arms back to give yourself a positive dynamic movement. I also truly believe that visualisation is a powerful tool when we are running – our perception of our movement has such an influence on the way we move that visualising elastic running can make us feel and act in a more elastic and dynamic way. Sam agreed.

'What we know is that, when you imagine yourself doing a movement, you activate exactly the same brain areas – the motor areas – that you actually activate to do the real movement,' he explained. 'So it suggests that you should get changes in your movement purely from visualising.'

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New York, USA

Some of these mind techniques may only lead to marginal gains. However, I have worked with a number of athletes who have found them extremely useful techniques to adopt for races and extreme challenges. Edwina McDowall is a great example. When we first met, she had already maximised her cardiovascular fitness, nailed her training plans, aced her nutrition and hydration strategy and pretty much knew her running dynamics without looking at her watch. During our sessions, we therefore focused on her mental approach to movement and the idea of adopting a checklist that asked questions of her movement and included positive self-talk in the answers.

So often, we wait until we are in trouble to get smart about our movement. By then, we have already run most of our race and the benefits have been marginalised. The big gain for Edwina as a result of our work together was that she was thinking about her movement from the moment that she stepped over the start line. She understood that by doing this she was making an investment that would pay dividends by mile 26. She used this to her full advantage when she took on the New York Marathon.

'The build-up to the race had been immense,' she told me. 'I'd made the decision to switch from a local race to the New York City Marathon in mid-September and it brought energy to my training. Once in New York and after my race number had been collected, I was in my marathon bubble! Two days of rest and relaxation gave me time to reflect on my journey; I was here to enjoy every moment of my New York Marathon experience. This alleviated my pre-race anxieties. I was fit, healthy and in the zone to race.'

What is very telling is that many of the pre-marathon training sessions with Edwina were not held out in the field. They were in a coffee shop. We spent our time discussing the mental checklist she would use to remind her of the movement techniques that had long become familiar to her from her own running and from our work together. At all times we worked on the basis that technique – and our focus on it – is vital from the start to the finish line.

'For me it's marginal gains, so being efficient, especially with my arm swing, tripod foot landing and a bow chest shape are great technique

reminders I have been working on,' Edwina continued. 'The power of the mind and strategies to overcome the challenges during a race is now very much part of the fabric of my training and racing.'

When race day finally arrived, Edwina was ready.

'I was both excited and anxious as I toed the start line,' she recalled. 'The words "form" and "pace"' echoed in my ears. I needed to hold my running form from the start and manage my pacing consistently. I felt like I was flying over the magnificent Verrazzano-Narrows Bridge. I had visualised the start many times and memorised the profile and length of the climb. This was first of many memorable bridges and a reminder of just how tough New York Marathon is physically and mentally. It was one of my favourite moments of the race. Even at that early stage, my mind was concentrating on my footfall, stride and listening to my breathing.'

The first half of the race went very well for Edwina. She was running with rhythm and seemed to be effortlessly clicking through each mile.

'My form felt good and I reminded myself of my running cues – "run tall, tripod foot landing and elbows tucked in" – as I headed into what I anticipated as a harder section of the course. For the next 5k I found myself holding my pace, reminding myself of all my undulating training runs around Pangbourne to Streatley and Goring, which had given me confidence about managing inclines on my long training runs. Queensboro Bridge felt endless and I could sense runners around me beginning to suffer. I picked up my pace as I ran down the exit ramp to 1st Avenue. This was the first time I had to dig a little deeper on the course. Positive thoughts of strong training sessions distracted me from the early stages of soreness in my legs.'

When she hit 20 miles – which, as the old cliché goes, is when the marathon 'starts' – Edwina used the opportunity to check in and run through that mental checklist. At this point, the bridges were taking their toll, her quads were sore and holding form and pace was getting harder. Every effort was now on being efficient and keeping herself moving well.

'I had run the final section in training when my legs felt fresh,' she recalled. 'My legs now felt heavy, every slight elevation felt significantly greater. I gave it my all, mind over matter, I was digging deep and the blue line on the path (the most efficient route to the finish line) was all I could focus on now. I could hear my heart pounding loudly. I had visualised the

finish many times and the final incline was as hard as I expected. I crossed the finish line, elated and exhausted, I truly had nothing left. New York Marathon had been so much more in so many ways than I expected, the fabulous five-borough course, loud cheers from the crowds along the way and amazing support from my family and friends.'

When coupled with her training and experience, Edwina's ability to apply the technique checklist that we had prepared – and, most importantly, to do so from the starting gun to the finishing tape – had given her the best possible chance to succeed. And she did. Edwina finished in three hours and one minute and was, incredibly, the fastest woman in her age category.

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In the same vein – but with plans to run in a very different environment – I worked with Danish athlete Kristina Schou Madsen, who took her movement and positive self-talk to the extreme as she attempted to become the fastest female to the summit of the highest mountain in Africa.

Mount Kilimanjaro, Tanzania

'It was the wildest thing I had ever set my mind and body to do,' Kristina told me.

'I remember being at Stella Point, 5756m above sea level. My body was screaming for more oxygen. All of my team was behind me, struggling with the high altitude and physical exertion. I was alone, out of breath and in pain all over. I glanced briefly at my GPS watch. If I kept pushing, I knew that I could still do it. I could still achieve my goal.'

Kristina's goal was to climb the world's highest free-standing mountain in under seven hours. She was extremely well trained and physically capable of this. However, when it got very tough – when she left her team behind in order to push on, when she was alone with only her own thoughts – it was the mental edge that kept her going. That is something that we had worked on in the build-up to her record attempt.

'As well as all of my training, I spent hours lying on the couch developing mental strategies to be able to enhance my performance and working with my mindset to believe the extreme challenge actually was possible. To be

able to cope and deal with unpredictable factors on the way to increase my chances of breaking the record. All of that came into play on that mountain as the voice in my head screamed more loudly than the tiredness, exhaustion and lack of strength could muster. It overwhelmed the physical and kick-started my body into a run as I moved on the crater side towards the top.'

Just like Edwina had done in New York, Kristina used a mental checklist to focus on her movement, bringing positive reinforcement into her self-talk.

'Come on, Kristina – you can do this! Keep your cadence high and posture straight. Accentuate your elasticity.'

These were some of the cues that she used and that kept her going at that vital moment.

'In reality, I probably looked very ungraceful stumbling the last final kilometer to the top, but I didn't feel it and I didn't care. My body was co-operating. My legs were answering my demands and my upper body was working like the purpose of my life was to break that record.

'In the last few hundred metres, all kinds of different feelings appeared. Happiness. Exhaustion. Proudness. Humbleness. Relief. Satisfaction. Pain. Thankfulness.

'I touched the sign on the top of Kilimanjaro, breaking into tears. I was so happy. I'd just broken the world record.'

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Our mind has a huge role to play in our movement. I believe that we can effectively utilise positive self-talk by creating a movement checklist to keep us focused and bring energy and mindfulness to our movement. It's an incredible tool in our arsenal and I urge any runner to create their own set of cues and incorporate them into their training and their racing.

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Vienna, Austria

Thursday 6 May 1954 and Saturday 12 October 2019. Two dates, 65 years apart. Both significant moments in history that challenged our perception of the limits of human performance. The former is the day on which Sir Roger Bannister ran the first ever sub-four-minute mile and the latter is the day on which the Kenyan distance runner Eliud Kipchoge became the first human on record to run a marathon distance in under two hours.

I wasn't alive in 1954 but I was fortunate enough to be in Vienna with a ringside seat as Kipchoge's epic attempt unfolded.

It was, in many respects, a controlled environment. Kipchoge ran at all times with seven pacers, each running for a few kilometres before rotating for fresher legs. They ran in a V formation to lower the air resistance. A car drove in front of the runners, projecting a green laser beam on the road to show the ideal line to take for the pacers and to ensure they stayed on record pace. Kipchoge ran in specially designed trainers and was running on a looped course that was described as 'pancake flat'. Not much was left to chance, and yet for all of the hype and detailed organisation, it was still down to one man to run a marathon distance faster than any human had ever done before.

It was by no means definite when the attempt would be, as it was weather dependent, so I had arrived in Vienna ahead of the tentative window. On what turned out to be the morning of the record attempt, I went out early and cycled the course, trying my best to maintain the pace that Kipchoge would be running at. It was amazing to think he was going to be running at a speed that felt that quick on a bike. The atmosphere that morning was worth the trip alone. When I used to rise early in the Rift Valley, it was always misty and cold before the sun got up. That morning in Vienna was the same and, at times, I felt like I could have been back in Iten or perhaps in Eldoret, where Kipchoge trains. I had a hunch then that the attempt would take place that day.

My remit was to take footage of him coming around on every single one of the eight laps. Having met him previously and discussed his running – gaining a personal insight into his own thoughts on the secrets of his success – I was fascinated to see his movement up close and witness how he interacted with the runners around him.

From the gun, he looked confident. As people surrounding me strolled around and queued for cups of coffee, only half paying attention, my eyes

were permanently fixed on the scene that was unfolding. I took footage of every lap to see how his gait changed over the course of the run. On lap one, it was pretty much everything I'd hoped for. He landed with a beautiful tripod, created a huge amount of impact, which he used to his advantage; rather than stomping on the ground, he rebounded and created propulsion to drive him forwards. His legs also cycled beautifully at a rhythmic and consistent 180 cadence.

The only concern I had was that his head position seemed to be affected by the runners who were drafting in front of him. He kept looking at the ground to check the feet of those pacers, whose stride pattern differed from his own. At times he would come out of the draft and then go back in, almost resetting his software and disassociating himself from their movement, before moving back into position. We can forgive him this, though. Let's face it, Kipchoge is not used to running with anyone in front of him!

By the final lap, his gait mirrored the first. His movement was so consistent. As he came up to the final straight, the car moved off and the pacers dropped away, leaving a smiling Kipchoge to take in the cheers from the huge crowd around him as he darted to the finish line. Those around me, who before had been milling around and queuing for hot drinks, were now fully engaged in the action. People were hugging complete strangers. Many were crying with joy. Everyone had bought into this man's attempt and the smile on his face was reflected in all around him.

This was one of the greatest moments in sporting history and an experience I was sure that I would never forget. It also brought into stark contrast a key point that will always be central to my coaching. My work and the foundations laid out in this section of the book have largely involved taking an anthropological view of a runner – working on the basis that if anyone moves in the way that a human was designed to move, that will help them run because they will be able to optimise the gifts that Mother Nature has given them. That means achieving natural, efficient movement in order to tap into our design as human beings. However, there's no denying that an early member of our species would have been moving for one particularly vital purpose: survival. It's fair to presume, then, that they were not trying to run the fastest mile or beat a distance world record while also hunting for food. In fact, to run at their maximum

pace would likely have been detrimental to their overall chances of survival.

For all of the reasons discussed earlier in this book, as a species we have now moved well beyond those hunter-gatherer days. A desire to push the boundaries of what humans are thought to be capable of has reframed the purpose of our movement. If we take all of the foundations in this section of the book and maximise them, then what we are actually doing is turning natural human movement into human performance. Just like Kipchoge, this whole-body movement skill – which makes the most of those gifts from Mother Nature – is something that we can develop in order to harness our own maximum potential. However, all runners please take note: 'performance' doesn't have to mean breaking records or trying to win the Berlin Marathon. It is not a term that is reserved for the elite. It is a relative term and something we can all achieve by optimising our own skills as a mover. This has only been further confirmed by the teaching and research I have carried out with the military's Human Performance Team in Hereford.

The areas discussed in this section of the book create an equation for our natural movement and a foundation for our performance. If we can land with a tripod landing and get height into our stride in order to allow our legs time to turn over, we can eradicate heel striking (and the consequential hard stop to our forward progress), reduce our ground contact time and increase our cadence. This does not have to be at the expense of our stride length, which we can maintain, or even increase, not by lunging forwards with our legs but by taking full advantage of that (upwards and forwards) height we are now getting so that we can bring our legs underneath us before landing. Our posture should be upright, like a figurehead on the bow of a ship, thus optimising our fascial system so that we create elastic recoil and elastic energy. Our head should be up with our eyes on the horizon, making us efficient and strong. Our arms should be directing our forward propulsion either side of our centre line so that our legs are driving in unison and we should be able to lean the whole column of our body forwards from our ankles to allow for a natural and effortless acceleration. Breathing should be through the mouth and regular but not directed by a single footfall and we should be using positive self-talk within our movement checklist in order to frequently tune in with our movement and remain mentally strong. All of this will allow us to move dynamically – even flamboyantly – and take full

advantage of our body's elasticity. In short, it creates an elastic equation for achieving and maintaining natural movement. It's an equation that, when complete, will not only ensure that we are making the most of the gifts that Mother Nature has given us but will also ensure that we unlock and unleash our performance potential.

Kipchoge famously said that a human has no limits. From a movement point of view, he is certainly evidence that we don't. And if we can take the foundations laid out above and apply them to our own running, I have no doubt that most humans can push beyond their own perceived limits.

That's the theory. What we are going to do next is address how, on a practical level, you can begin to do just that.

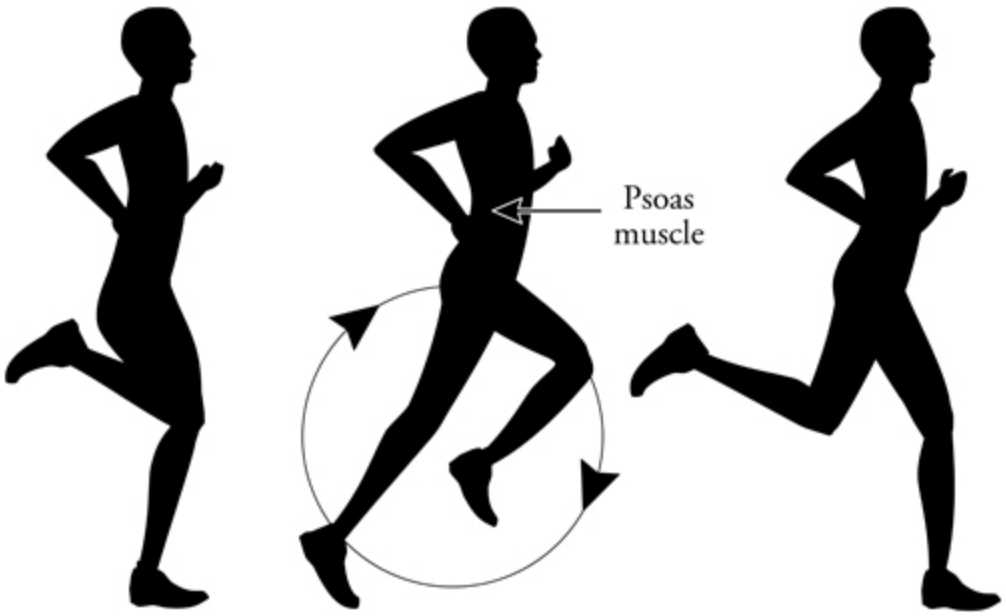
PART III

THE PRACTICAL

THE PRACTICAL

Your movement is like your fingerprint. While it follows a set of well-defined principles that are common to our species, it is nevertheless unique to you.

As a consequence, your movement is yours to own whatever your perception of yourself as an athlete. And let’s be clear, anyone who does something athletic has the right to call themselves an athlete and should take pride and interest in their movement. A running novice should treat it with as much fascination and detail as a world record holder should. In fact, there’s no reason why the novice can’t learn to move better, more naturally and more efficiently than even a world record holder. When it comes to moving as our species is intended, speed or fitness doesn’t really come into it.



Examples of good running form optimising our natural elasticity

Common examples of poor running form (including ‘shuffl ing’ with one foot always on the ground; head tilted down; tight shoulders, lazy arms; over-striding, bending forwards at the waist)

Taking ownership of your movement is one of the most liberating and exciting exercises that you can undertake as a runner. As you’ve seen, I’ve gathered a series of key principles from my journey that I believe you should always keep in mind as you apply the learnings from this book to your own running. Here are the headlines:

- I believe that if we move the way a human is designed to move, that will make us a better athlete. It sounds simple but due to the negative nurture that most of us endure in our everyday lives (from sitting and being sedentary), we, as a general rule, no longer move like our ancestors because we no longer need to in order to survive. As a result, many of us have simply forgotten (or have never learned) how to move beautifully and efficiently.
- Altering our movement can be incredibly exciting and liberating. Suddenly we are practising running as a skill rather than just going out in that new pair of expensive trainers and trying hard.
- Our perception of our movement has a huge influence on the movement itself. If we change our perception, we will go a long way towards changing our movement. Don't think of yourself as mechanical. Think of yourself as elastic, fluid, connected and synergistic. Imagine a long train of elastic running up an invisible centre line in your body (from your navel to the top of your forehead) and adopt a tall posture that keeps it pulled tight, bringing your hips forward and your pelvis into neutral, thus optimising the resultant elastic energy. Learn to know and love your centre line. Make it your running buddy. Give it a name. Give it a colour. You need to take it everywhere with you.
- When changing or creating movement patterns, we are working with our software (brain) as much as our hardware. Muscles create strength for specific tasks but they don't really have a memory. If we understand that we have a cerebral as well as a physical challenge ahead, we are far more prepared for success.
- Our dynamic movement will always be an extension of our everyday movement. How we sit, walk and stand in our day-to-day lives defines the sea of tension that we take into our running. Essentially, how we stand when we make a cup of tea is how we run. This is incredibly exciting. Our elastic system rejuvenates and rearchitects based on how it breaks down. Therefore, if we sit, stand and walk beautifully, we have a much better chance of running beautifully. One of the biggest opponents to our dynamic movement is the chair. Sitting all day is the cause of a huge number of issues, from bad backs to poor posture. While we are sitting in the office wishing we were out training, our bodies are slowly shrinking and decaying. I can't encourage you

enough to use a standing desk. Provided that we adopt a good posture, it's effectively training by preparing our body for the task of moving well. This is not cardiovascular fitness but what I like to think of as 'Darwinian' fitness – i.e. fitness to perform the task.

- Is it strength and conditioning or conditioning for specific strength? There are a huge number of runners who, perhaps when returning from an injury or when looking for improvements in their performance, will turn to a strength and conditioning regime. I think that any runner considering this should first ask themselves the above question. Often, when we hear the phrase 'strength and conditioning' we immediately fixate on building strength. However, heading straight to the gym and doing intensive repetitions involving weights may not, in itself, create the specific strength that you need. We therefore need to be able to make an informed decision about whether the exercises that we are doing are just building strength for strength's sake or whether they are capable of conditioning our body for the specific task of running. As runners, our priority should always be to condition ourselves to run beautifully and efficiently. The best way to strengthen the body for running is to simulate dynamic running movement. This is a huge challenge for strength and conditioning coaches and physiotherapists – and many that I have worked with acknowledge this (in fact, it was the senior physiotherapist for the GB diving team, Gareth Ziyambi, who really helped me to develop this thought process) – because it's very difficult to simulate a running movement when static. Dynamic movements that are designed to simulate running often do not allow for correct impact and deceleration. If, for example, you have weak glutes, just lifting weights in the gym to strengthen them will not necessarily give you the tools you need to load them correctly when you run. It's possible that all you are doing is successfully adding to the muscle mass that you have to carry around and refuel with oxygen and calories. What you need to do is load your body correctly in order to engage the glutes. If we run beautifully, we condition the body and that builds specific strength. The runners with whom I have worked in Iten and Bekoji are incredibly strong athletes but have no access to a gym. The women whom I observed in the Himalayas carrying heavy loads on their heads do not prepare their bodies in a gym. They build strength

by conditioning themselves for the specific task every day. And they achieve that by repeatedly doing it well. So, if you have an hour to become a better runner, ask yourself whether a traditional view of ‘strength and conditioning’ is what you need or would it be better to spend that time conditioning yourself for running-specific strength? If it’s the latter, I can recommend a brilliant workout that involves 4000 repetitions in one exhilarating short burst. It’s called a parkrun. Do it beautifully and you will be building strength to perform.

- Your brain (or ‘software’) can easily become your nemesis. Your brain loves efficiency. It doesn’t follow, however, that it will immediately recognise a more efficient way for you to move. While your current movement may not be that efficient, you have become very efficient at doing it and your brain has adapted to that movement and loves it. Showing it a new movement, even if it’s technically a more efficient one, will have the brain sulking and disagreeing. There’s a good chance, then, that the new movement will feel awkward and harder and you will wonder how it’s ever going to feel natural or become easier. But our brain is also ready to be convinced and, if you persist, it will ultimately agree that this new movement is more efficient and will embrace it. Once the brain is onside, it will be a cheerleader for this new movement and your potential is limitless.
- Expect it to feel hard. As you practise new techniques, your perceived rate of exertion will almost inevitably increase. New information to your brain, new breathing patterns and new movements will mean that, at points, you will be thinking that as great as it is, you can’t keep it up for more than a few hundred metres. This happens to almost everyone I work with, regardless of their cardiovascular system. It’s the reason so many people attempt to change their movement and bail pretty early during the process. As with most skills, it will never be tougher than the first few times you do it but, provided that you stick to it and are patient, that perceived rate of exertion will level out. I like to think of it as a Couch to 5k for your movement. Those first few sessions will be hard but we have all seen where starting small can ultimately take a runner.
- Make running beautifully your default. I believe that we all have a default in our movement. When we are exhausted or lose

concentration, that's where we end up. We need to make sure that our default is a natural and relaxed movement and, to do that, we need to ensure that we are running as much as possible in that state. To focus less on mileage and more on beautiful relaxed movement. When we are learning new movements, it is intuitive to take the task by the scruff of the neck and attack it. However, tension in the body (or, more specifically, in our muscles) is also our nemesis, creating brakes and shackles both physically and mentally. My time in Africa has shown me that the coaches and athletes there work very hard on establishing a default of relaxation in both the mind and the body. When making changes to our movement patterns, then, we must approach it in as relaxed a state as possible.

- As we have discovered, the key to running as our species is naturally designed to run relies upon connected and synergistic movements that combine to create an elastic, fluid motion. When you feel ready to start trying out these techniques for yourself, here are some practical steps that you can take to put the learnings from my journey into practice.

FOOT PLACEMENT

We must try to take full advantage of the foot's natural tripod when we land (see here). That way, we maximise stability and proprioception and will be loading our body more naturally. To ensure that you perfect the tripod landing, you need to first understand how you are currently landing when you run. So many of us think that we have eradicated heel striking only to find that, when we see footage of ourselves running, our heel is still hitting the ground before the rest of the foot. I would encourage you to video yourself (or get a friend to video you) running and then slow down the footage in order to see how your foot is landing.

As I did with Eros Adamides, the blind runner I worked with before he ran the New York Marathon, you can also don a pair of noise cancelling headphones and listen to your footfall as you run. This allows you to hear the difference between a hard heel landing and a soft tripod landing. Once you get used to the sound, you will begin to notice the difference in feel as you land.

CADENCE

By far the easiest, cheapest and most effective way to understand and adjust your cadence is to use a metronome. Remember, we are looking for a cadence of 175–185 steps per minute in order to join in with the elastic frequency of our body, so ultimately you should set the metronome up to replicate that in beats per minute. First, however, you need to understand your current cadence. This will vary from runner to runner and will also depend on the terrain that you are running on – it may be as low as 150 or as high as 210. Adjusting your cadence will be a challenge, so it's better to move up or down by a few beats at a time, remembering that it's always important to maintain good form.

It's worth noting that if you're using a watch or other device to measure your average cadence, it's very challenging to take an accurate reading during a full training run. That's because you are likely to stop, speed up and slow down during a run (whether to cross a road or open a gate on a trail) and this may affect the reading. To get the best results, choose a straight and flat section of pavement or trail and begin to run at an easy pace (for you) before starting the device that you are using to measure your cadence. Then ensure that you stop the device before you slow down and stop at the end. This should give you an accurate reading of the average cadence that you are naturally running at.

In following the beat of the metronome, some runners like to track cadence by their feet landing and some prefer to use the motion of their arms swinging. There's no right or wrong with this – your arms and legs are moving together so it's whichever you feel most comfortable with. You should try both, to understand which works best for you. Beware, though –

when coaching runners and working on cadence, I tend to see the arm or leg creating a forward motion to meet the bleep of the metronome. Our brain likes everything to be in front of us. However, you should try to envisage the arm or leg moving to the *rear*. This is because the work that we do as runners should all be happening underneath us and behind us.

As you get used to running with a metronome, there will come a point when the rhythm feels normal and you no longer need the constant beeping to remind you. You should now be able to run without the metronome and more intuitively 'feel' your cadence.

Cadence is very important but it should not come at a cost to your movement. Cadence should not be used to correct form, as I was doing in the early days of my coaching. That is a shortcut that will not last and will almost certainly hinder your dynamic movement.

STRIDE LENGTH

If you are in the middle of a run and you want to catch up with a runner in front of you, you should not attempt to run faster by increasing your cadence. In fact, your cadence should remain the same. Instead, use your stride length to dictate your speed.

Using the metronome again, find a flattish section to run on and practise increasing and decreasing your speed using an increase/decrease in your stride length while maintaining your cadence. Beware, however: do not increase your stride length by stretching your leg out in front of you. The inevitable consequence of that is landing on your heel and sending the full

weight of your landing up a straight leg. That's one of the worst ways to dissipate impact. Instead, aim to get more height (or vertical oscillation) into your stride – importantly, you should be pushing upwards and forwards – and cycle your legs beneath you.

To lengthen and maximise the efficiency of your stride length, you must manage the curve of your oscillation. Imagine a bungee cord attached to your chest as you are running, with the other end of the cord attached to an object that is pulling you towards it. As you move up into the air, the bungee cord will draw you forwards led by the chest, allowing you to create oscillation (or 'air') that takes you upwards and forwards. Once you have created as much forward trajectory as possible, you can play with increasing your oscillation. As you adjust that 'upwards and forwards curve', you will be adjusting your stride length.

Striding with an upwards and forwards trajectory, with legs cycling underneath

It's easier to move beautifully fast because dynamic movement hides a whole bunch of idiosyncrasies in our form. It's much tougher to run beautifully slow. The challenge is to run fast but slowly! Learn to relax but get that same cycling motion with your legs, with your arms joining in dynamically, as if you were running fast. You need to get beautifully tall, feel elastic and fluid even if you are just running around the park.

I would encourage you not to do interval training only for your cardiovascular system – as many runners quite rightly do – but to do interval training for your gait. For example, if you are training for a

marathon and, on average, running at an 8cm vertical oscillation, do some intervals where you reach 9.5cm vertical oscillation. If you can't measure it, just increase your bounce by feel. Granted, you couldn't do the whole marathon like this but you couldn't do one at your fastest interval pace either. Having a body capable of doing it over short distances will make you more capable of being dynamic and elastic when it's not as accentuated. This is about creating a more dynamic body – if you can open up your body to run more dynamically when going fast over a short distance, you will get used to moving more dynamically so that you can take advantage of this when running slower for longer.

RUNNING DOWNHILL

Take all the reasons why we would not want to heel strike on the flat and then double them for why we mustn't heel strike as we descend. As we run downhill, it's vital that we focus on stability, proprioception, the dissipation of impact, managing deceleration, and the creation of elasticity. We should descend with short strides and softened knees and make sure we are always adopting a tripod landing. This is one place where you should not worry about your cadence. From the data that I have gathered from my athletes, I have seen elite runners descending with a cadence of up to 240 steps per minute. This gives them better control, as they can stop or change direction far more easily. Increased cadence also aids proprioception, giving improved feedback on impact and the terrain as well as greater spatial awareness.

As we descend, our arms should be relaxed and used to balance the body. We should maintain a lengthened spine and be aware of our head position. Of course we need to look down when we are running downhill but we must remember that our proprioception, elasticity and the weight of our

head are all dependent on the position of the head so our default should be head up and eyes on the horizon.

RUNNING UPHILL

Remember that, through evolution, we chose an elastic rather than a muscle-based strategy. If we load our legs by lunging forwards, we have to dig ourselves out using muscle strength. That's not sustainable. Leaning forwards at the waist and overstriding, as so many of us do, will load our quads and calves, leave us tiring very quickly and potentially injure us in the process. It also compromises our elasticity. To be elastic, we do not need to rely on an explosive power in our muscles to dig us out, not even when running uphill. As we ascend, we should use the gradient of the slope to our advantage. If our feet land underneath us, they can follow the slope behind us. If we stride up the hill, leading with our leg too far in front, we have to load our calves and quads in order to dig that leg back out and lift our whole body up the slope, putting huge pressure on our legs and lower back. Lactate will inevitably be produced far more quickly and chances are we will suffer.

When running uphill, posture is key. Most runners seem to have a strange magnetic force that draws their upper body, led by the head, towards the hill and creates a bend from the waist.

Concentrate on all of the good posture tips for running on the flat and, remember, you do not want to carry a 42lb head up that hill. So keep your head up!

Don't take on the hill and attack it. You should be relaxed. Your arms should be at a 45-degree angle and move up towards the chin as opposed to being led to the rear by the elbows. You do this because your legs will follow the momentum from your arms and we want to be lifting our knees and still achieving bounce in our stride.

POSTURE

Utilising our fascial system will allow us to create elastic recoil and elastic energy, taking work away from our muscles and tapping into our body's natural energy source. Remember the idea of a giant elastic band running up the centre of your body from your toes to the top of your skull? If you run hunched forwards with your head down, that elastic band will be loose and there will be very little recoil, meaning your muscles will have to do all of the work. Muscles tire and need fuel and so the more help you can give them the better. If you run upright and tall, you will pull the elastic band tight, creating a natural recoil that provides energy and propels your muscles. The great thing is that the 'elastic band' doesn't need fuel and doesn't tire. If you want to move efficiently and effectively, you need to make use of this natural elasticity.

An elegant pose engaging our elastic system (as demonstrated by James Earls here)

Our dynamic movement is largely based on posture and our dynamic posture will only ever be an extension of our everyday posture. How we sit, stand and walk is therefore vital to how we run. We must practise good posture every day. Stand beautifully. Sit beautifully. Even when you are making a cup of tea, do it beautifully. Train at work by using a standing desk. Don't slouch!

When we run, we should run tall with our chest out, creating a bow with our centre line. We must avoid bending forwards at the waist. Imagine that elastic running up your body and use your posture to pull it tight in order to take full advantage of the gifts that Mother Nature has given you.

THE HEAD

Remember: the average head weighs 12lb. For every inch that your head drops, you add a further 10lb of weight to your spine. Dropping it a mere 3in when you are running will therefore be the equivalent of running around with a 42lb head.

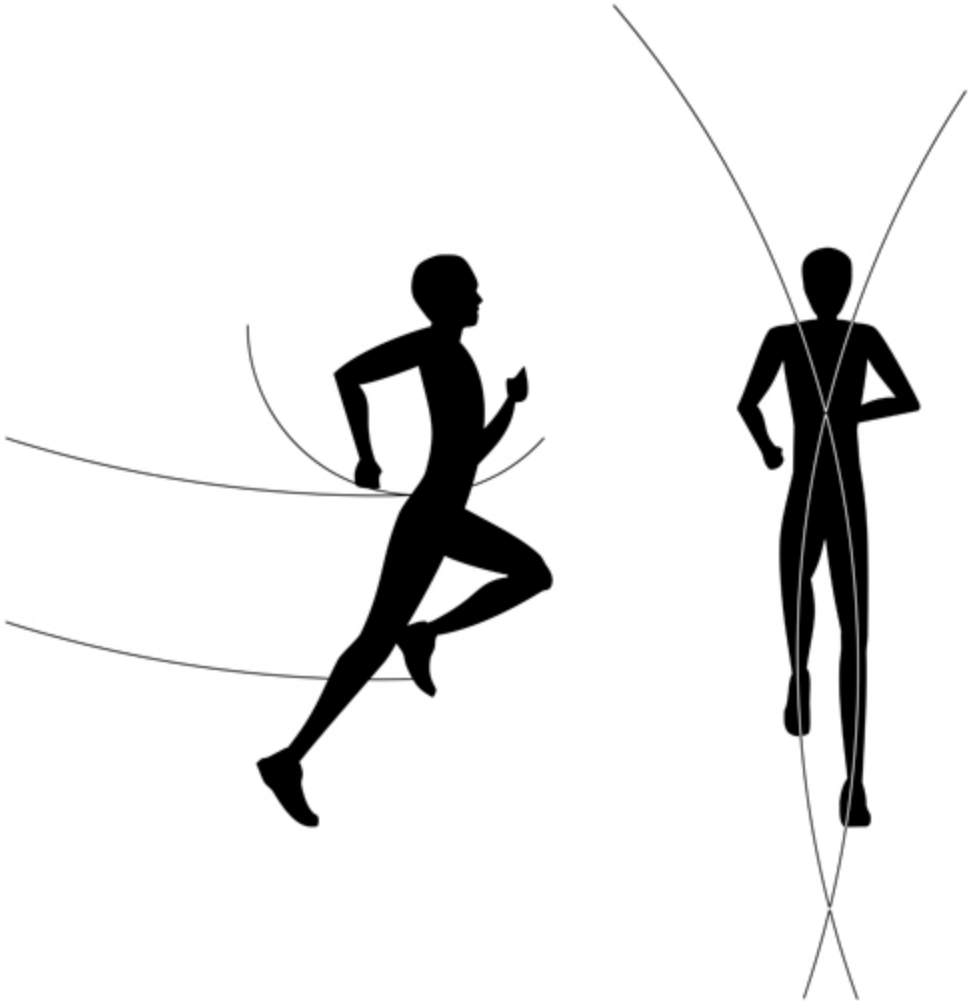
If you are having trouble keeping your head up with your eyes on the horizon, I suggest that you use kinesiology tape. Attach it just below the hairline and run it down the spine of the neck with a fair bit of stretch on it. You can use the tension of the tape to monitor your head position. This could also be done on the side of the neck if you tend to lean your head one way or the other.

Remember, the tape does not hold the head; it just heightens your senses to its movement.

Your everyday head position is going to influence your dynamic head position. Again, be mindful of whether you are slouching and looking down at a screen all day (or even just when you are on your mobile phone). Try to be upright with your eyes forwards whenever you can be. Try to make this your default.

ARMS, SHOULDERS AND HANDS

As a species, we run with our arms. They are the ultimate scene setters for the cadence and rhythm in our body. If we use our arms dynamically, they provide propulsion and direct positive momentum in our legs (your right arm’s movement is symmetrical with your left leg and your left arm’s with your right leg).



The relationship between our arms and our legs

Good arm movement is dynamic and relaxed. First, focus on your elbow. It's the elbow that leads the arm swing with a dynamic movement to the rear, starting at the rib cage at a right angle and moving back so that the hand goes to where the elbow started. The elbow then returns to its original position and the process is repeated. The elbow should never come in front of the rib cage.

It's absolutely key to remember that negative muscle tension is a runner's enemy. All of the dynamic movement is concentrated on the rear movement, but once the elbow is as far back as it needs to go, relax the arm. It does not need to be driven back into place – doing that leads to a very mechanical motion that uses far more energy than is necessary. Gravity and

elastic recoil from your fascial system will bring your arm back into place for you.

You need to relax your shoulders, too. So many runners hold their arms high by tensing their shoulders. This will only inhibit the sliding back of the elbow and restrict your movement.

You could argue that we run with our fingers as well. Soft fingers with the fingertips touching in some way encourages good symmetry. Whatever we do with our hands must be symmetrical as they send strong messages to the arms, which send strong messages to the legs. A hand that is open and flat will often create a chopping motion and a hand with a thumb up can create an upwards movement, for example. If the fingertips are touching they will close the proprioceptive loop and create the perfect tension sensor for the body, allowing you to feel your arm far better. If the fingertips are relaxed then so are the arms and vice versa. If negative tension reaches the arms, it will spread around the body like a virus. We should feel the delicacy of our fingertips and use them to maximise body connectivity.

Here's something to practise. When you are running, isolate in your mind the movement of your left arm and right leg so that they are moving to the rear together. Then swap and focus on the opposite arm and leg. It's a great way to test the relationship between your arms and legs and can provide a fantastic mid-run reboot if you are struggling.

Remember, your arms and legs will move together no matter what you do. However, if you have no concept of what you are doing with your arms when you run, there's a good chance that they are moving around like clothes in a washing machine, randomly falling with no order and no forward momentum. Given that your arms direct your legs, your entire running gait will follow this pattern. However, if you own your arm movement, creating intentional synergy between the movement of your arms and legs, then you will move with efficiency and positive forward momentum.

A NATURAL LEAN

Gravity is our friend and, if managed correctly in the form of a lean in our run, can contribute significantly to our propulsion.

This is one of the more difficult running techniques to master. Most people, when they are asked to lean, will do so by bending forwards at the waist. This is most definitely not what we want. The lean needs to come from the ankles and be accompanied by a bow in our body, (which we achieve by creating a bow from our chest and accentuating our height – see here). This opens up our centre line and tilts our centre of gravity, which in turn influences our propulsion. It also increases the surface area for the lines of our fascia and increases our elasticity.

A word of caution: when you lean, if your legs are not relaxed then your stride will not open up underneath you – either you will pull out of the lean to keep yourself upright or increase your cadence. Assuming that you are already running at your optimum cadence, this is not efficient.

I would encourage you to video yourself (or ask a friend to video you) when practising this technique.

BREATHING

It may sound odd to hear that breathing can affect running form but it is vital not only in promoting good form but also in maintaining it. Oxygen is so fundamental that we panic if we don't get enough and our movement changes. Breathing should be dynamic and is related to the rhythm of our movement. It is also an extension of our everyday breathing.

A word of caution. Your breathing loves to attach itself to a rhythm and the obvious rhythm of the body is the movement of your arms and legs. If you increase your cadence, there is a very good chance that your breathing rate will try to follow the same rhythm. While it is sensible to associate your breathing with your cadence so that, by way of example only, you breathe in on three footfalls and out on three footfalls, be careful not to

associate your breathing too closely with a single footfall or there's a risk that you will be taking extremely short, shallow breaths, particularly if you are increasing your cadence. This is not a one-size-fits-all solution. What works for you may not work for another runner. As you practise, be sure to persevere as you get used to running at a new rhythm and adjusting your breathing pattern accordingly.

THE MIND

Good movement is achieved when the whole body is connected and working as one. Importantly, this includes the mind. Our ability to maximise our running potential through mastering a movement skill will be influenced by our ability to ask questions, experiment and give ourselves feedback. It will also be influenced by the positive or negative nature of that feedback.

As our actual movement is strongly influenced by our perception, building a bespoke list of questions about how you are moving will keep you in regular contact with your body. These can be used as cues, moving up the body in sequence (using the headings in this chapter), to ensure that you remember the areas you need to focus on.

There is an added benefit to this. Many of us use a mantra when we run and we have already learned from Samuele Marcora that positive self-talk has a beneficial impact on performance. Many athletes whom I have coached have had very positive results from framing body cues as questions and creating an answer in the form of positive feedback. Here are some examples:

Question: 'How is my foot making contact with the ground?'

Answer: 'With a tripod landing – I'm maximising the stability and proprioception of my foot, dissipating impact effectively and turning it

into elastic energy.'

Question: 'What is my head doing?'

Answer: 'My head is up. My eyes are on the horizon. I'm keeping the weight off my spine and taking in the view!'

Question: 'What are my arms doing?'

Answer: 'My arms are moving dynamically to the rear, optimising the synergy with my legs and giving me positive forward momentum.'

I encourage you to create your own cues and positive responses. This is a great learning tool for your movement and also a brilliant way of building positive self-talk into your running.

FINAL WORDS OF WISDOM

Running technique has to be one of the most subjective issues out there: 10 minutes of investigation on the internet will generally confuse rather than confirm what you should or should not be doing. Mother Nature gave us some amazing gifts as runners but many of us have forgotten or simply never learned to harness them. If we rediscover them and use them, we can transform our dynamic and everyday movement. Ignoring these gifts simply means that our muscles have to work in ways they were never designed to. Muscles injure or tire more quickly because we misuse or overuse them and, with such a repetitive movement as running, any issues are bound to be found out. We have the ability to be incredibly elastic in our movement, with both recoil and the creation of elastic energy. So, if we start to move beautifully, we will develop a body perfectly designed for this skill.

And here's the most important message of all to remember: it's never too late! Even if you currently sit slumped at a desk every day, the system that is responsible for our potentially synergistic, connective, fluid and elastic movement can rearchitect itself in as little as seven months and continues to

rejuvenate throughout our lives. Even if you can’t do it now, your ability to run beautifully and with natural movement can be totally reborn and you will reap the rewards in terms of performance and injury-free running.

There is clearly a symbiotic relationship between fascia, bone and muscle and we must not forget about the latter two and their importance in our movement. However, I always urge people to focus on their fascia because it’s the one that most of us don’t realise we have and yet is the one that, as runners, we should be most excited about.

So, I urge you to forget that new pair of trainers, that lighter pack or that pair of socks that you are convinced will improve your performance. I implore you to stop throwing money at the problem and, instead, to start taking ownership of your movement. Trust me: it’s the best investment you will ever make.

EPILOGUE

ITEN, KENYA

I sat in a corner of the hotel bar, one eye on a powerful view of the Rift Valley, the other on him.

Dressed in a short-sleeved white shirt and black trousers, he was drinking alone. Occasionally, people would wander over. Some would sit with him for a while and then leave, visibly uplifted by their brief exchange.

I watched. Waited. Hoping for a moment when our meeting might appear like a chance encounter.

To achieve this well-intentioned deception, I attempted to give off an air of utter relaxation. Like I was just enjoying a drink. Writing some emails. Inside, though, I was a wreck. I knew that this was my big chance. After six years of work, this was the reason that I'd come back to Kenya. I'd done my reconnaissance, chatted to local sources and worked out that this was my best opportunity to stage a meeting. I'd already been here on a few occasions with no sightings. Now I had eyes on the subject.

He stood up and walked over to the bar. He drained the last of his drink, my opportunity to engage disappearing as quickly as the dregs. He casually placed down his glass, nodded thanks to the barman and made for the door.

It was time for action. I stood up casually and walked towards him.

'Brother Colm?' I asked, as he had all but passed me.

He turned and we made eye contact. He didn't look surprised to be recognised – the man was a celebrity here – but he didn't look particularly delighted either.

'Really sorry to bother you,' I found myself stuttering.

Silence.

‘Erm. Is there a good way for me to contact you?’

Now just a face of confusion.

‘I’m a running coach. I’ve come all the way from England. I’m fascinated by movement. I’d love to spend a little bit of time with you to discuss my research. Anything you can spare.’

I was now throwing words at him, hoping that some would stick. I got the feeling that this wasn’t an uncommon occurrence, although I imagined that he may have heard more eloquent pitches in his time.

To my relief, no doubt sensing a man who would not be afraid of begging on his knees if this went on much longer, he replied with kindness.

‘Why don’t you come down to St Patrick’s on Tuesday morning at eight?’

I was uncharacteristically shocked into silence for a brief moment. The man known as the ‘Godfather of Kenyan Running’ had just invited me to his hallowed home turf.

I must have thanked him at least 350 times as he walked out of the bar.

***

Ben Mutai was waiting for me on the street corner. I’d let it be known that I’d be there to run a pop-up workshop. In Iten, word of mouth is an incredible thing.

Ben was an African running coach who organised many unattached runners (i.e. those who did not have agents and weren’t part of any of the camps here). I’d connected with him on social media and was keen to get the opportunity to work with these raw athletes. These guys and girls were dedicated. They were up every morning at 5 a.m., training hard and then going home. They had no official coach, no races and no current prospects to run for a living but they were focused. It was a hand-to-mouth existence. They were running and running, hoping to be noticed. Hoping to get the chance to race in Europe.

We had arranged to meet here at 5 a.m. but at 4.55 a.m. it was just us. With three minutes to go, there was still no one there. Then they arrived in their droves, coming from everywhere in sixes and sevens, some holding hands, all cheerful and chatting enthusiastically.

I've tried various modes of transport to chase down runners over the years. Mountain bikes, snow bikes, 4x4s, a tuk-tuk, a Russian campervan and even a helicopter. I've been transported all over the world, even on a horse and sleigh to Outer Mongolia. I once ended up riding through lanes of traffic in the busy centre of Tallinn in Estonia on an old Second World War push bike that you had to pedal backwards in order to brake. I can tell you now that our species was not designed for that!

Today, I'd hired a motorbike and a rider and despite the hair-raising nature of some of my experiences, this was most definitely high on the list of edgy. I sat back-to-back with the rider, holding a camera. This allowed me the best view of the runners behind us. Unfortunately, it also allowed me absolutely no view of what was coming. The only warning I had if there was a bump in the road or an oxen standing in our path was by looking out for the wide eyes and grimaces of the runners behind us as they realised what we were about to hit. Several times, we braked heavily and my head cracked back into the rider's. Several times we fell off. The lengths I went to in order to get up close and personal with an athlete in mid-flow knew no bounds. I may have been safer with the sharks!

As time went on, though, we got ourselves together and got a warning system going.

I was following the runners, filming and watching closely. Towards the end, the rider even got very good at riding close to them. It was fascinating to watch their elasticity and their footfall from so close that I could touch them on the shoulder. Sometimes, you can see more with the naked eye than through the footage taken with a video camera. It's another reason why you need to be there to see it for yourself. It was a privilege to watch these guys flying. Everything I'd learned over the last six years was playing out in front of me. The difference from my first visit to East Africa was that I could now explain it. I felt like I'd been let in on the secrets and now I could sit back (metaphorically!) and enjoy.

As we sped through the countryside, little children would pass us running gracefully in the other direction on their way to school. They were nearly always barefooted. It's almost a cliché but I couldn't help thinking that the next generation of great runners were passing us by. They were shouting at the athletes and cheering because they grew up wanting to be like them. They were training and they didn't even know it.

And here I was, ironically, coaching these adults on the thought processes surrounding elasticity. Even though most of these guys and ladies were incredibly elastic, I still felt that if they knew *why* then potentially they could accentuate that movement even more. Because so much of our movement is based on our perception of our movement, they could really tap into that even more. As far as I'm concerned, there isn't a runner on the planet who doesn't benefit from seeing themselves move, seeing data on their movement and also being more aware of what it is that makes them good. There also isn't a coach who wouldn't benefit from seeing that in respect of their runners.

I was about to put that theory well and truly to the test.

***

I got up super early the next morning and got a bike to drop me at St Patrick's High School. There was no sign of Brother Colm. I was told that he'd been called away and most likely wouldn't be in. My heart sank.

Looking out across the school grounds, I spotted a man talking to a group of young runners. I made my way over to him and introduced myself. He told me that his name was Ian Kiprono and he was Brother Colm's assistant coach. I decided to try my luck and told him that Brother Colm had given me permission to come down and watch the day's sessions.

'No problem,' he nodded, as the athletes were filing in from their dorms.

That was easier than I'd expected. I was in.

I spent a fascinating day with them and got to know Ian quite well. I made sure that I blended in. I didn't push myself forward at all. I just watched and admired the incredible runners and noted things down that I wanted to explore further if given the opportunity.

The next morning, I went back for more, only this time, Brother Colm appeared. He looked at me with vague recognition.

'Oh, you're here?' he said.

'Yes,' I replied. 'Actually I was here yesterday with Ian. I really enjoyed it.'

He gave me a second glance. His expression suggested that he was now intrigued by this persistent coach from England.

It was a track day. That meant a 30-minute journey through the Rift Valley. All of the runners arrived and started filing on to a large yellow bus. I got on behind them and sat at the very front, leaving a spare seat beside me, hoping that Brother Colm would sit there and I could bend his ear on the journey.

He was the last person to get on and I looked up at him expectantly. He made no eye contact and walked straight past me and the glaringly empty seat, making his way to the back of the bus to sit with some of the louder characters. He spent the entire journey laughing and joking – wearing their hats and chatting with them.

Instead of breaking the ice with the legendary Irishman, I therefore melted in the heat while enjoying the awe-inspiring countryside that we drove through.

When we arrived at the track, Ian took the runners out and they started their warm-up. I set up my gear and did my thing, running around getting some footage of the athletes. After a while, Brother Colm finally approached me.

‘I see you’re taking a very keen interest in what we do,’ he said.

‘Absolutely,’ I replied, ‘it’s why I came back to Iten. To see what you do and learn from you.’

I didn’t realise it at the time but, as well intentioned as it was, that wasn’t the best answer. Brother Colm was used to people coming out to Iten and trying to get in front of him. He was also used to them studying him and his athletes and taking learnings away and, afterwards, never seeing any data or feedback that benefited his runners. It was so often a one-way street. His initial slightly guarded reaction to me was therefore an understandable one in that context.

My journey had started in Bekoji, wondering how those runners had left me in their dust. I knew that it wasn’t blood and guts that made them faster. They were living proof that running was not a try hard skill but a beautiful fluid motion. I’d already established that negative muscle tension was a runner’s nemesis. It was here, though, that not only did I have all of that reaffirmed but that I realised just how important relaxation was in running. On a scale that I had never even imagined.

The athletes were warming up, running at 12-minute-mile pace around the track. At this point I was thinking ‘Come on guys! Let’s see some 4.30s!

I've taken three planes and a Land Rover to get here and you're 12-minute miling.'

After 20 minutes, Ian blew a whistle and all of the runners stopped. Some lay on the grass. Some got back on to the bus. Some even went to sleep!

I couldn't quite believe what I was seeing. These were the next generation of Kenyan runners and yet they were moving slowly around a running track and then lying down to rest. It seemed like a long bus ride for just that but, given their reaction, I figured that we may well have seen the best of the action already.

I looked to Brother Colm.

'What's happening now?' I asked him. 'Is that it?'

He smiled.

'No no. We're just getting ready.'

I was confused.

'If that's the warm-up,' I said, 'then why do you not go straight into the hard work now. Surely otherwise they lose the benefit?'

Again, he smiled. This time, though, like a parent about to explain something simple to a child.

'That isn't why we do it,' he replied. 'We weren't warming up from the point of view of preparing the body for the session, at least not in getting the cardiovascular system going and the muscles firing like you are thinking. What we just spent the last 20 minutes doing was building relaxation into the body. We want relaxation to be the default.'

Now I was excited. Brother Colm explained that, after their rest, the runners wouldn't go straight into a hard session. They would wind up their movement, starting at a relatively slow pace and building from there. He used the analogy of a long jumper. The further back the long jumper ran from, he explained, the further forwards they could jump. Here, he said, the more his runners were relaxed, the better their peak would ultimately be.

He said that of any runner in a session or a race or in their life, if they were always at their peak – or running close to it – then they were always going to be mediocre. He believed that a runner's peak was determined by how much they relaxed.

And you could really see that in his runners. They went to great lengths to talk, laugh and joke and relax. Like on the bus ride over, he was making a clear effort to engage in a fun and happy outlook with the athletes he was

working with. When they started the warm-up, yes, they were getting the body moving but it wasn't to build to a faster pace. They were purely focused on building their levels of relaxation.

I couldn't help but think what a big change this was from the coaching and training that I was seeing back at home. Most of us warmed up for a short amount of time, if at all, and then viewed a session within two parameters – easy and hard. In fact, most people's 'easy' was nowhere near easy enough to be relaxed. According to Brother Colm, the danger with that approach was that we could only ever then be average. In contrast, these guys and girls – who could knock out sub-five-minute miles for fun – were spending a lot of their time running 12-minute miles. They would wind it up slowly, building from a solid base of relaxation, before they then eventually hit a peak.

What this clarified for me was that, when we are training, we are always building our default. A place we will go to naturally, which means the place we will end up going when we get tired. For me, that had always been about building a default of beautiful movement but now I was adding relaxation to that list. These runners had it in their body from the first lap and even when they got tired later in the session and their default mode kicked in, that mode was, again, to be relaxed.

I felt like I was breaking the ice with Brother Colm as we discussed this but it was when we were discussing impact and ground reaction force that his defences truly dropped.

There I was, rattling on about the potentially positive consequences of impact on how high we go and on our stride length. I mentioned what a pleasure it was to watch his athletes running around with good oscillation and hitting the ground with a good, true connection. He seemed very excited by this. He commented that his athletes grew up in bare feet so had absolutely no fear of hitting the ground whatsoever and had therefore never been afraid of impact. That's why, he said, they had no trouble creating height in their stride.

This was music to my ears and I mentioned to him that I could measure it.

Momentarily, the defences went up again.

'Oh, yes, but we never really hear back,' he said, clearly reluctant to allow me to strap his athletes up with sensors in order to obtain data that I would just take away with me.

‘No,’ I replied. ‘I can put this on your runners, they can run around the track and we can look at it together right now. I can tell you their vertical oscillation, ground contact time, stride length and cadence, how much deceleration there is in each footfall and how hard they are hitting the ground. I can video it for you and you can see it right now in real time.’

His eyes brightened. ‘So I can use this to benefit my runners now? I can actually get feedback as we stand here?’

I nodded and, with his now enthusiastic permission, I demonstrated on some of his athletes.

From that moment on, we spent the whole session together analysing the data and discussing the results. He answered my questions and listened to me waxing lyrical about fascia and elasticity, tensegrity and the sea of tension. I was bringing a whole new way of thinking to him – a man who had coached some of the most successful runners on the planet. A man who had been doing this since the 1970s. Don’t get me wrong, he wasn’t humouring me. If he didn’t agree with something that I was saying, he pulled no punches. But we found an exciting amount of common ground despite coming at running from two very different perspectives.

Eventually, as I do with all of the runners with whom I work, I got the tensegrity model out and showed him the analogy of the tensegrity model and the symbiotic relationship between the bones and the muscles and the fascia. He loved it. He got excited about it. He was able to liken it to the way his runners were moving.

When the session finally ended, everyone piled back on to the bus. Again, I got on last. Again, I sat at the front with a spare seat next to me. Again, Brother Colm was the last one to get on. This time, though, he sat down next to me.

We carried on talking all the way back to the school. We discussed everything from cadence to coaching, from athletes to Arsenal Football Club. If I’d managed to meet him six years ago when I’d first tried, I could probably have just about held my own talking about Arsenal but that would have been it. This was a perfect moment in time for us to come together.

When we got back to the school, all of the athletes went back to their dorms. I went with the coaches to eat porridge and drink tea. Brother Colm went off to do something. In the staff room, we were joined by two Austrians, Robert Winkler and Barbara Gräftner.

Ian introduced them as a film crew who were making a film about young runners in Iten, called ‘Secret of the Kenyan Runners’.

They asked me what I was there for. Still buzzing from the morning’s session, I started to talk about some of my discussions with Brother Colm, what I had learned from him and also what had been confirmed and validated for me after a six-year journey.

Robert went pale.

‘We’ve been out here for five months making this film and we’ve got nothing like this at all,’ he said. ‘We’ve barely got him speaking on camera.’

They asked me if I’d be prepared to repeat the session and interview Brother Colm for the film. I was flying at 1 p.m. the next day but agreed that we could try to make it happen in the morning.

And what a session it turned out to be.

The next day, we started at the crack of dawn. Fresh home from a trip to Monaco to collect the IAAF Rising Star Award was Rhonex Kipruto. A young man who at the time had just recorded the second-fastest road 10km time in history with a 26.46 finish (and has since gone on to break the world record), and who was the world under-20s 10,000m champion in 2018. And with him was the guy who came fourth in that same championship race, Solomon Boit.

These two were from the cream of Brother Colm’s latest crop of talented athletes. And you could see why. They were incredible athletes and it showed in their movement. I spent the next few hours interviewing Brother Colm, repeating a lot of our conversations from the day before and analysing these two rising stars by video and using movement sensors to measure their running dynamics. We lost ourselves deep in discussion. In fact, we pushed the time so much that I literally said my goodbyes to him as the cameras were still rolling.

I came to genuinely admire and respect this quiet and humble man. I learned that he was not aloof or arrogant, as his initial reaction to me may have suggested, but just incredibly protective of the youngsters with whom he worked.

I left with an open invitation to return. What’s more, I agreed to leave Ian with all of my equipment so that he could continue to monitor the data and so that we could share ideas and information in the future. I’d found myself

a new research partner. Possibly one of the greatest partners I could have ever imagined.

Pound for pound, this had been the best trip I'd ever had. It was a defining moment. It confirmed so much of my work. Verified so much of my thinking. Brother Colm also added a new, deeper, more experienced perspective that gave me confidence to move forwards knowing I was on the right track.

As I looked back from the car, I watched him walking away. Then something caught my eye. He was still holding my tensegrity model, pulling the elastic back and forth to create a fluid motion. He was smiling with wide eyes and shaking his head. Shaking it in a way that suggested that perhaps a penny had dropped. That he'd now seen something that had been previously hidden in plain sight.

I was now certain that our discussions had struck a chord with him. A man who had worked with thousands of talented runners was now thinking about and understanding their movement with a new eye. I had given him – the 'Godfather of Kenyan Running', a man whom I had read about in books – something new to think about. Perhaps even to build upon. It was something that I hoped, with the help of Ian, we could build upon together.

This incredible journey that started with me in pieces on a red-tinted dirt track in Bekoji had taken me all around the world. Across six continents. From the Arctic, to the jungle, to the desert, to the mountains and then, full circle, back to a track in East Africa. It had opened my eyes and my mind to so much and had culminated in a few incredible days in Iten swapping ideas – and finding common ground – with one of the greatest coaches in the history of distance running. This wasn't just a final piece in the jigsaw. It was like a beautiful gold-tinted frame. One that wrapped around the now whole puzzle. Elevating it. Securing it in place. It was a jigsaw that could now be hung on the wall for all to see.

But it was also a lot more than that. Driving away from Iten and trying to take in the events of the prior few days, I was truly excited. It wasn't just a culmination of the past six years that was inspiring me, though. No, I was excited about the future. For, in that moment – as amazing as it had all been – I just couldn't shake the feeling that this journey may have only just begun.

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